Board diversity and Earnings quality:

The association between female board presence and the magnitude of discretionary revenue activities, evidence from US-listed firms

Abstract:

A popular stream of scientific literature addresses the question of how various board characteristics influence the board effectiveness. This thesis aims to add to this literature by investigating the association between the female board participation and the use of discretionary revenue recognition in a firm. Using a sample of S&P 1500 firms from 2007-2014, this thesis finds that female board presence is negatively associated with discretionary revenue recognition. This association is more pronounced for higher percentages of female board participation. However, no evidence is found to support the 'critical mass' condition (Joecks et al. 2013), indicating that female directors do not feel urged to conform their opinions to those of their male colleagues without a minimum of other female board members (30% of total board positions)

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1. Introduction

1.1. Introduction to the topic

This thesis will conduct research on whether female board members show different behavior regarding the use of discretionary accruals. A number of countries, such as Norway, Sweden and The Netherlands, are in the process of installing various forms of quota-based laws regarding women in executive or board functions, to promote equal opportunity amongst men and women (Senden, Visser. 2013). In response to these new laws, firms and regulatory agencies are interested in investigating whether there is a 'business case' for women in corporate functions, or whether the issue revolves around equal opportunity arguments. In light of this development, and as an extension of two opposing views regarding gender in the business world as introduced by Talmud and Izraeli (1999), who theorize that gender can either be a correlating variable to other individual-level variables or that gender institutionally makes a difference in the business world, an interest in research on whether or not women behave differently from men has arisen (E.g.: Adams, Ferreira. 2009; Campell, Minguez-Vera. 2008; Bear et al. 2010). Discretionary accruals meanwhile are also subjected to both academic and practitioner debate as the use of such accruals can be considered both positive to firm value through signaling of private information, and as negative through malicious intent by management. (E.g.: Nelson, Skinner. 2013; Jiraporn et al. 2008). This thesis investigates an association similar to Srinidhi et al. (2011), however this thesis differentiates itself in key specifications (a detailed comparison is provided in chapter three).

1.2. Introduction of the thesis question

Arfken et al. (2004) indicated that investors pose doubts on the ability of homogenous boards to effectively engage in their designated tasks. Especially, as homogeneity has been associated with increased group-thinking and a decreased perspective width, investors pose doubts as to how well these homogenous boards could fulfill their main task: monitoring management behavior. In combination with the aforementioned interest in the involvement of female board members, this thesis aims to investigate the association between board heterogeneity and one of the issues relating to management behavior: the use of discretionary accruals. Considering that the use of discretionary accruals is neither necessarily a positive or negative issue, this thesis will aim to address the following thesis question:

What is the association between female board member presence, and the magnitude of discretionary accruals use?

In order to investigate this question, this paper will make use of a set of sub-questions.

What theoretical foundation is currently available in support of the suggested association?

What relevant empirical research is currently available?

In what way can this thesis *contribute to the existing body of literature?*

First, this paper will aim to investigate the association between the presence of female board members and the magnitude of discretionary accruals use. Second, research has shown that for women to fully feel comfortable in exerting their different characteristics, a 'critical mass' condition must be met (Joecks et al. 2013), hence this thesis will aim to investigate the effect of a minimum threshold of female board members on the discretionary accruals use. Third, relating to the concept of diversity, this thesis aims to find what association exists between boards that are diverse to varying extends and the magnitude of discretionary accruals usage.

1.3. Relevance

The insights gathered from this thesis could be considered value adding because of the following. First, as indicated by Harrison and Klein (2007) indicated, academics researching diversity issues have interpreted diversity in various ways. As this makes comparability of results cumbersome, this thesis aims to provide a bridge by constructing diversity in various ways. Second, the majority of research on factors influencing discretionary accruals use or earnings management has focused on models using some form of overall variable for the discretionary accrual. Using insights from Stubben (2009) who found that overall measures lack explanatory power compared to specific discretionary accruals in detecting earnings management, this thesis will make use of a particular form of discretionary accruals in the form of discretionary revenues.

1.4. Methodology

To determine the association between the various variables modeling gender diversity and the magnitude of the discretionary accruals used, this research will use a cross-sectional regression analysis. This thesis will use a sample of S&P 1500 listed firms between 2007 and 2014 to, subject to a number of control variables, draw conclusions on.

1.5. Demarcation and limitations

Prior to this thesis, a number of demarcations and limitations are known to affect corporate board and earnings management investigations. First, the number of factors influencing corporate board decision-making is large, and their effects cannot be excluded from the modeling without creating inaccurate observations regarding the strength of the statistical association between female board presence and discretionary revenue recognition. Considering the simplified nature of a model, this thesis has to carefully consider the control variables necessary to account for known factors influencing financial reporting decision-making.

Second, because the decision-making by corporate boards is not completely open to outsiders, investigations regarding this decision-making are likely based on theoretical implications rather than actual implications. Hence, the transferability of theoretical results to real implications must be done in a conservative manner. Third, this thesis will focus on the statistical association between female board presence and earnings management, however it will not become clear whether female board members make a board more ethical, or if ethically more desirable boards appoint more female members. Finally, the outcomes of this investigation will be limited to the statistical association between female board presence and earnings management through discretionary revenue recognition without any remarks on whether the observed cases of earnings management are ethically sound or not.

1.6. Structure

The remainder of this thesis is structured as follows. Chapter two will present the framework within which this thesis is conducted. This involves clearly defining the concepts used to ensure consistency throughout the remainder of this thesis. Chapter three will discuss prior literature related to both gender diversity studies and studies discussing discretionary accruals or earnings management related issues. Using the conceptual framework of chapter two and the literature review in this chapter, chapter three ends with the formulation of testable hypotheses. Chapter four will introduce the statistical model used in this thesis, along with

comments on the data sample and control variables. Chapter five will then proceed to present the outcome of the statistical tests conducted in chapter four. Additionally, this chapter will translate the outcomes in to real-world implications. Chapter six will conclude this thesis by summarizing the findings in this thesis, as well as presenting remarks on the limitations and demarcations of the findings brought forth by this thesis. Suggestions for future research based on the findings in this thesis will be presented at the end of chapter six as well.

2. Theoretical framework

This chapter will provide the theoretical framework through which this thesis will address the association between gender diversity and the use of discretionary accruals. First, this chapter will comment on corporate boards, what role they are perceived to fulfill, as well as how they are composed. Second, this chapter will outline a definition of diversity that will be maintained throughout the remainder of the paper. Third, this chapter will define hypothesized psychological differences between genders, and how these differences translate to a boardroom setting. Fourth, this chapter will elaborate on the concepts of earnings quality, earnings management and discretionary accruals. Finally, this chapter will indicate how the constructs used during the thesis relate to one another.

2.1. Corporate boards

This section will address what corporate boards are, what functions they are perceived to have, and how boards are composed. This section will rely heavily on the literature summary by Adams et al. (2010).

The objectives assigned to a board of directors are widespread, however the following definition of what directors are responsible for appears to receive a vote of consensus: "directors serve as a source of advice and counsel, serve as some sort of discipline, and act in crisis situations" (Mace. 1971 p.178). Although over time the emphasis on the individual tasks has changed (Adams et al. 2010), the general thought behind the role of directors has remained unchanged. When a firm is faced with a challenge which management has not faced before, the members of the board with expertise in that respective field can serve of a source of counsel to management. The most predominant task of boards in recent history has been to act as a form of discipline towards the firm's executives, to ensure that their activities are in line with the objectives of the owners of the firm. Acting in a crisis situation, in the terminology as used by Mace, reflects the board's duties when a change of the Chief Executive Officer (CEO) is necessary. However recent examples such as the early-millennium accounting scandals, and the more recent financial crisis in addition saw increases in the board activity. Concerning this thesis, the most relevant task of directors is the exercising of discipline, and related to this as well the monitoring, over the management of the firm. Hence from here onwards, this task will be commented on, whereas the other tasks of the directors are only addressed if they show overlap with the task of interest.

Research on board effectiveness is severely hindered by a number of factors. First, as all corporations are required to have a board, no variance in the population exists, which makes it impossible to assess whether or not boards work (Adams et al. 2010). As a consequence, in order to find whether or not these differences possess explanatory power regarding the observed differences in how firms function and perform, research takes an approach that investigates differences across board characteristics (Adams et al. 2010; Dechow et al. 2010). A second, and likely more pressing issue is that of endogeneity. A body of theoretical and empirical evidence suggests that the governance structures do not arise exogenously, however that these structures arise endogenously because the economic actors select their structure as a response to the governance issues that they face (Adams et al. 2010). As each individual firm faces different governance issues in different settings, this makes generalization of optimal board characteristics decreasingly valuable, yet increasingly difficult. Third, a general issue in research relating to corporations is that corporations are complex: however for a model to be comprehensive it needs to be a simplified version of the real world observations. Since models are by construct a simplification or excerpt of the real world, models do not fully reflect the real world workings. However considering the endogenous nature of governance structures, taking certain aspects as given has a stronger impact on the transferability of the results from the model than with issues that have a predominantly exogenous origin. Adams et al (2010) suggest that to circumvent these issues, research on board structures should take theoretical research into account more than in other areas of research. Moreover, when using the large body of research available on teamwork and business hierarchies, one needs to take carefully into consideration the unique nature of corporate boards when attempting to apply this literature in a corporate board setting.

In this thesis, the role of corporate boards on monitoring the accounting policies and actions of management is of interest. Early-millennial accounting scandals have called for obligatory audit committees to be present on the boards of all US listed corporations. The roles of these committees are defined by the Sarbanes-Oxley act as follows: "*A committee (or equivalent body) established by and amongst the board of directors of an issuer for the purpose of overseeing the accounting and financial reporting processes of the issuer and audits of the financial statements of the issuer; and if no such committee exists with respect to an issuer, the entire board of directors of the issuer*." (Sarbanes Oxley Act of 2002. §2. 2002) Based on this definition, one can observe that the role of the audit committee in the financial reporting process is critical. However, the goal of this thesis is not limited in scope to what association female board members have with unauthorized accounting practices. As will be commented

on later on in this thesis, many forms of earnings management are well within the Accounting rules and hence will not necessarily becomes issues treated by the audit committee. As this thesis aims to investigate the association between female presence on boards and the use of discretionary accruals, which in itself is not illegal, the scope that this thesis takes on is that of the entire board, and not solely the audit committee.

2.2. Diversity

Harrison and Klein (2007) address a pressing issue in the diversity research, that there is a seemingly large discrepancy in how researchers define diversity. Common definitions of diversity revolve around the different scoring of subject within a group on a certain characteristic. However as indicated by Harrison and Klein (2007), these definitions are still rather vague, as they leave up to interpretation how these subjects differ, and on what sort of characteristic. Their article proposes a categorization of diversity in three distinct groups: Separation, Variety, and Disparity (Harrison, Klein. 2007.). Here, separation indicates that the subjects differ from one another in their horizontal position or opinion. Examples include ethical standpoints, opinions, goals and processes. Variety is a categorical form of diversity, and simply put indicates that subjects belong to different categories (qualitative groups). For example, a project team that consists of employees with differing expertise would be categorized as diversity through variety. Disparity indicates that subjects hold differing portions of socially valued assets or resources. Examples would be differing levels of pay, social status, or decision-making authority. (Harrison, Klein. 2007). The authors pose that, if one wishes to correctly assess diversity, it is essential to define to which of the before signaled categories the diversity issue belongs.

Assessing gender diversity on corporate boards, one can construct the diversity issue as either one of the previously signaled categories. As a significant portion of available governance literature advocates, corporate boards will function optimally when its components are drawn from various backgrounds (Arfken et al. 2004;Hagendorff, Keasy. 2012). This diversity of components is theorized to reduce group thinking, as well as generating more creative and generally more complete solutions to problems. Generally, each member of the corporate board will serve as a lens through which the team views issues, where team members from different backgrounds or different expertise are able to filter out more unique sub-issues and are able to communicate these issues to their team colleagues (Marsch. 2002). Alternatively, if all group members were to be completely identical, it would make the addition of group members redundant as no new viewpoint or source of information is added (Marsch. 2002).

Although variance in categories such as content expertise or network ties intuitively can be related to increased board effectiveness, this straightforward connection for diversity based on gender is lacking in this setting. This unclear relation is due to two reasons. First, even though people understand the concept of variety in relatively equal terms, there remains a discussion on the correct method of quantifying this form of diversity (Harrison and Klein. 2007). A disagreement exists on how the diversity distribution should be established. Here the issue pertains to the number of different groups to which a subject can belong, and the relative size of each sub group to each other. The second reason for the lack of a connection between genders as a form of variance pertains to the conflicting theories of gender as a correlate variable on one side, and gender as an institutionally differing factor on the other side (Talmud. Izraeli. 1999). If gender is most predominantly explained as a correlating variable with other individual-level variables, then increasing the variety of gender in a team will not per se show any of the aforementioned effects. Possible evidence for either theory regarding gender differences can, amongst others, be found in an analysis of diversity as defined by separation.

As indicated, separation is defined as a within group difference of opinion or belief (Harrison and Klein. 2007). When the main task of a board is to monitor the activity of the management of the firm, having board members that differ on beliefs of what managerial behavior is tolerable or not could improve the monitoring of managerial behavior. As it is possible to isolate and analyze these issues on a case-by-case basis, it becomes possible to identify a possible difference in gender-based psychological differences. If it becomes evident from tests that male and female team members have differing opinions or ethical beliefs on relevant topics of governance, this could strengthen the argument to account for gender in composing a corporate board.

As a third point, even if gender-diversity could aid in improving the quality of the board functioning, the third category of diversity could be of influence. This category, disparity, indicates that within-unit members possess, or have access to, differing proportions of socially desirable resources such as status, decision-making authority or even compensation. Until this day, women are still perceived to be treated differently in terms of career prospect, an observation which in addition can be found in the difference in growth of women in executive or director roles compared to the growth of women participation in the labor force. However, assessments on whether this is the case exceeds the scope of this thesis. Concerning this thesis, it is important to focus on the first two categories of diversity: Separation and Variety. Ultimately, the goal of this thesis is to analyze to what extend gender diversity

(variety of gender on corporate boards) associates to the use of discretionary accruals (separation on the belief of what is condonable behavior by management).

2.3. Gender-based psychological differences

In this section, comments on gender-based psychological differences will be presented. These differences constitute cases of 'separation' as identified in the previous section. Considering the wide scope of possible differences, this thesis will only focus on those differences deemed relevant to this study. As indicated in the introduction, this thesis will use two conflicting theories on gender-based psychological differences as introduced in a directors setting by Talmud and Izraeli (1999). In their research, the authors indicate that gender can either be a covariate of other individual-level constructs (I.e. education, social background), or that gender is in fact an institutional factor that explains the variation in the performance. The ground for using this theoretical framework throughout this thesis is based on notion that as of yet, no clear favoring of either of the two theories dominating the other exists.

Gender as a social construct or an institutional difference

Although a large body of research determined various characteristics in which men and women differ, a stream of research poses doubts on whether these differences are inherit to gender (Nature) or if the way society views gender roles (Nurture) is driving the observed differences. Gneezy et al. (2009) conducted research on differences in competitive behavior amongst men and women in a matriarchal (the Indian Khasi) and a patriarchal (the African Maasai tribe) society. They found that although competitive behavior by men and women in the Maasai tribe followed the theoretical foundation where men are more competitive than women, the Khasi society showed inverse behavioral patterns in that the women were more competitive than the men. This finding served as a starting ground for further research whether nurture (the roles and the behavior instilled in societal actors by their environment) serves as an explanation for the observed differences in gender-based psychological differences.

Booth and Nolan (2012) found that girls attending single-sex high schools were more likely to engage in a real stakes lottery than girls attending coed schools are. Booth et al. (2014) conducted a similar experiment amongst first-year college students. Their findings were that although female students were less likely to take risk in the lottery than men, female students in an all-female environment showed more risky behavior after 8 weeks than female students in coed classes. The findings of these two experiments hint at the theory that what is observed

as female characteristics (higher risk-aversion) might be because of social norms rather than inherit gender discrepancies.

A research with findings that are of interest to managerial research is that of Johnson and Powell (1994). Their research compared participants who are either defined as non-managerial, and those that are in a managerial function or have enjoyed management education. Whereas the participants that did not have a management education showed results in accordance with gender psychological theory, the management subpopulation showed no difference in risk behavior between men and women. Master and Meier (1988) and Birley (1989) showed similar results for small business owners and entrepreneurs, respectively. Two arguments for these observations were provided in Croson en Gneezy (2009): Selection bias and adaptive behavior. Selection bias implies that people with similar and relevant characteristics will pursue certain roles (i.e. Management position or business ownership), whereas adaptive behavior implies that people over time conform their behavior to that associated to the role. All findings presented in this section indicate that what was previously considered a difference in behavior caused by inherit gender differences might actually be explained by social constructs, however an absolutely definitive answer remains unavailable.

Risk aversion and overconfidence

A frequently investigated difference between men and women in an economic setting is how the two genders differ in risk-taking behavior. Croson and Gneezy (2009) indicated that given a situation with uncertainty, men and women experience different emotions regarding the uncertainty. Whereas women are more prone to feeling fear regarding the uncertainty while men are more prone to feeling anger. Psychological research found that, in an identical situation with identical uncertainty, subjects feeling anger perceive that situation to be less risky than those subjects feeling fear regarding the situation. Given these two findings, it is to be expected that men perceive identical scenarios as less risky than women.

Charness and Gneezy (2012) review data of 15 investment game research papers, and find strong evidence that men are significantly more risk-taking than women. Through the sample used, which is based on a similar investment game conducted by different researchers under varying specifications without primarily focusing on gender differences, their findings of more risk taking behavior by men are robust to various sensitivity issues. Lemaster and Strough (2014) in addition found evidence of more risk tolerance by men compared to women. Moreover, the authors found that participants in the experiment, who during self-evaluation considered themselves to posses more stereotypical masculine traits, exhibited

more risk tolerance than participants scoring lower on the masculine personality traits variable. In addition, the authors found that the levels of testosterone, which as been associated with many typically masculine traits such as aggression and thrill seeking, does not explain risk tolerance contrary to what was previously assumed (Lemaster, Strough. 2014).

Hibbert et al. (2013) provide evidence that when individuals have enjoyed a high education, the discrepancy in risk tolerance between men and women becomes even larger. However the authors do note that, when individuals have enjoyed a high education in financial topics, the difference in risk tolerance between genders becomes negligible. These findings support the hypothesis that differences in observed characteristics between actors of differing genders are likely due to environmental influences rather than inherent gender-based differences.

Competitive behavior and decision context

The before signaled factors of men being relatively more overconfident and more risk tolerant have been used as an argument as to why men are observed to me more competitive than women. Niederle and Vesterlund (2007) explore the willingness to compete in a setting where virtually all context-sensitive arguments as to why women appear to be less eager to compete (such as the desire to raise children in a competition for a time-intensive job or the perceived lesser ability at the task at hand by either gender) are eliminated, and still found that men were significantly more eager to engage in competition than the female participants were. In a later research by Niederle and Vesterlund (2008), the authors found that while the eagerness of men to compete is independent on whom they face in competition, women are significantly more eager to compete against other women compared to their eagerness to compete against mixed-gender opposition.

In contrast to the findings that women are innately less competitive than men, Wieland and Sarin (2011) argue that prior research is largely conducted in domains where men have shown to perform better than women and hence results are biased towards men being more competitive. Their research conducts experiments in competitiveness of men and women using knowledge quizzes that pertained to subjects that both genders were hypothesized to be equally apt at, and one subject that either gender is hypothesized to perform better at. It is argued that while men were more eager than women to compete during the quizzes that pertain to their superior domain, this same observation could be made regarding the larger eagerness by women to compete in their respective superior domain.

Research in the field of psychology has indicated that the moral decision making of women is more susceptible to social cues surrounding the decision to be made compared to men (E.g.

Croson. Gneezy. 2009.). That is, women are more likely to change what they consider appropriate behavior depending on the conditions of the decision-making scenario, whereas men are more likely to adopt one decision making policy over differing scenarios. Croson and Gneezy (2009) found evidence for this theory in their investigation of various allocation game researches. They found that both within-experiment and between-experiments analysis revealed that men are less likely to adopt multiple decision principles than women. These findings are reinforced by Miller and Ubeda (2012), who found that individual men are far more likely to stick to one principle for decision making in allocation games compared to women, who tend to switch from a decision principle when the decision context is altered.

Critical mass

Prior to the explanation on what differences in behavior between genders in a boardroom setting are expected in this thesis, this section will comment on the notion of a "critical mass" as introduced by Joecks et al. (2013). The authors pose that, for women to feel comfortable with exerting their unique behavior and opinions in a boardroom, they need to be surrounded by a minimum amount of likeminded individuals (in this case other women). The authors test whether the relation between firm performance and boardroom diversity based on gender follows an "inverted U" distribution, rather than, for example, a straight-line distribution. In highly skewed groups, it is found that the minority participant deals with the incumbent participants by either hiding behind stereotypes or by conforming behavior to the incumbent. Additionally, the incumbent participants display different behavior compared to uniform groups, leading the uniform groups to outperform skewed groups (Joecks et al. 2013). The authors find that firm performance reaches an optimum with female participation of roughly 30%, providing an argument against *tokenism*, where women are appointed to a board as severe minority groups. Moreover, the authors find that only when this critical mass condition is satisfied, firm performance of the *tilted boards* exceeds that of *uniform boards*.

Gender differences in board rooms

Considering the goal of this thesis to investigate the possible difference of board members of differ genders in their willingness to tolerate the use of earnings management, it is essential to investigate how the aforementioned signaled psychological differences translate into the board room setting. This section will provide a formulation of what the expectations on this topic will be throughout the thesis, using prior research on gender differences in the board room in other decision making contexts as support for the claims made.

The evidence provided by various authors (E.g. Johnson. Powell. 1994; Hibbert et al. 2013) suggests that when men and women have enjoyed a high level of financial or managerial education, the risk-averse behavior exhibited does not differ significantly. As shown by Burgess and Tharenou (2002), an overwhelming majority (89% for female board members in the US) of female board members has enjoyed *at least* an undergraduate education; hence the higher education condition is likely satisfied. Moreover, in their research De Anca and Gabaldon (2014) found that female board members have frequently enjoyed a higher level of education than male board members. Combining these findings with those of Hibbert et al. (2013) as signaled previously, this article assumes that women board members will not show different behavior regarding risk aversion. This thesis is aware that this assumption relies on another assumption in that board members of both genders have enjoyed higher education in either managerial or financial topics, as Hibbert et al. (2013) showed that when individuals are highly educated in other topics, the discrepancy between male and female risk aversion becomes greater rather than smaller.

Since research has shown that women tend to exhibit less overconfidence (Huang and Kisgen. 2012; Prasad and Mohta. 2012.), this thesis will assume similar behavior. This implies that given the context of the use of earnings management, women board members will be less likely to condone the figurative borrowing of earnings from a future period, as they will be less confident in their ability to direct future period activities in such ways to revert these borrowings, ceterus paribus.

Recent research has found that previously considered differences between the two genders, where men were considered to behave more as agents, while women behave more communal, are beliefs that both men and women still adhere to (Kusterer et al. 2013). Under these stereotypes of behavior, men are considered to be analytical, numerical, and less susceptible to the welfare of a broader group in their decision-making. Women, in contrast, are considered to behave less analytical, are more interested in non-numerical objectives, and are *more* susceptible to the welfare of a broader group. Considering these notions, the assumption is that corporate boards with female board members participating will undertake actions that are *more* socially desirable than those boards that are uniformly male. Research has found that companies with higher rates of women on their boards are associated with more ethical behavior (E.g. Bernardi et al. 2009) and increased board effectiveness (Adams, Ferreira. 2009). Considering the role of the corporate board in the new stakeholder perspective as indicated by corporate governance codes around the globe, this would translate into a better protection of all stakeholders, and hence more socially desirable activity by companies with

significant female participation on the board. Finally, the assumption is that the before signaled effects are stronger for those boards meeting the "critical mass" condition as proposed by Joecks et al (2013).

2.4 *Earnings quality and discretionary accruals.*

This section will present commonly used models to investigate the quality of the reported earnings. Dechow et al. (2010. P. 347) define reported earnings as: "Reported Earnings =f (X):

X is the ''enterprise's financial performance during a reporting period,'' which SFAC No. 1 states is what earnings, a primary focus of financial reporting, should represent.[6]".

Here, the function is embodied by the accounting system in place in a firm. Moreover, as many researchers have identified a number of issues related to empirical issues in this field, these issues will be commented on intertwined with the respective models to which these issues relate. The section will end of with the presentation of the selected method of computing the discretionary proxy that will be used in this particular thesis.

Earnings quality

First, it is essential to identify what earnings quality is. Earnings quality is defined by the Statement of Financial Accounting Concepts no.1 as: "*Higher quality earnings provide more information about the features of a firm's financial performance that are relevant to a specific decision made by a specific decision-maker"* (Dechow et al. 2010. P. 344). Dechow et al. (2010) identify three important features of this definition. First, the earnings quality is context-specific depending on what party uses the earnings information. As will be explained in the following comments on accruals models, this discrepancy between perceived importances of various information users makes generalizing findings of quality across stakeholders difficult, or even undesirable. Second, the earnings quality depends on how informative this information is regarding the financial performance of the firm, which has many unobservable aspects. The unobservable nature of many performance factors proves to be a continuing source of limitation to academics. Finally, the earnings quality is determined in joint fashion by the relevance of the underlying financial performance to the decision-making, and the ability of the accounting system to measure performance (Dechow et al. 2010). This feature explains in which ways the published earnings can be altered by a firm. First, firms can undertake what is known as "real earnings management", whereby managers elect to undertake or forego certain transactions in order to alter the published earnings. This

means of using earnings management affects the underlying financial performance of the firm, and hence influences the first part of the feature. Second, the management of a firm can elect to use their discretion over certain features of the accounting system to alter the earnings of the firm, known as "accounting-based earnings management". Again, it should be noted that neither of the activities are by nature illegal or destroying value for the users of the financial information (Tucker, Zarowin. 2006; Jiraporn et al. 2008). Because of the stigma associated with accounting manipulation caused by the accounting-fraud scandals around the turn of the millennium, executives of US listed corporations have shied away from using accounting-based discretion in favor of real earnings management (Graham et al. 2005). However as DeFond (2010) noted, through the convergence of United States Generally Accepted Accounting Principles (US GAAP) and International Financial Reporting Standards (IFRS), where US GAAP will adapt a more principle-based approach than it uses at this moment, it is to be expected that US corporations will increasingly rely on accounting-based activities once again. Hence, this thesis still focuses on the accounting based activities, specifically on the use of discretionary accruals.

Discretionary Accruals

As indicated, the management of a firm can use the accounting system to change published earnings during a period. Based on accrual-based accounting, this is realized by using the discretion that management has over the accruals. An essential distinction is that between normal and abnormal, in addition qualified as discretionary accruals. Normal accruals reflect a change in the accruals caused by changes in the underlying financial performance, such as for example growth in Plant, Property and Equipment (PPE) as a consequence of expansion in good times. Abnormal accruals on the other hand, reflect changes in the accrual value that are not explained by changes in the firm performance, and hence are caused by management. In accounting research, when researching the use of earnings management, the fact that it is unobservable for the researcher whether accruals are either normal or abnormal will cause methodological problems. More specifically, as researchers have to first derive a proxy for what constitutes the use of discretionary accruals, every statistical test conducted serves as both a test of association as well as the validity of the construct. McNichols (2001) identifies three broad categories to which the then available research articles belong. The first stream of research focuses on aggregate accruals, in which researchers attempt to find drivers of normal accruals and where the residuals of a test are considered the abnormal- or the discretionary accruals. A second stream of research investigates individual accruals, and is mostly used to

investigate the use of earnings management in specific industries. Third, a stream of research focuses on the partitioning of the published earnings around certain events. This form of research investigates motives for management to engage in the use of earnings management. Considering the scope of this thesis, this stream of prior research will receive less attention.

Aggregate accruals

The most frequently used model for determining the use of discretionary accruals is that of Jones (1991). The model introduced in her research has proven to be the foundation of many subsequent researchers. In her model, discretionary accruals are estimated as the error term from the following regression equation:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_1 \left[\frac{1}{A_{it-1}}\right] + \beta_{1i} \left[\frac{\Delta REV_{it}}{A_{it-1}}\right] + \beta_{2i} \left[\frac{PPE_{it}}{A_{it-1}}\right] + \epsilon_{it}$$

The dependent variable is the Total Accruals for a firm in a given period (scaled by the lagged-assets). $\beta_{1i} \left[\frac{\Delta REV_{it}}{A_{it-1}}\right]$ represents the amount of accruals explained by the change in revenue from the prior period to the period under review. $\beta_{2i} \left[\frac{PPE_{it}}{A_{it-1}}\right]$ represents that portion of total accruals explained by the level of gross Plant Property and Equipment. Both these coefficients were incorporated to control for changes in the business conditions of the firm, in which the alpha coefficient is incorporated to scale the residual term to equal proportions. As indicated, the residuals from this regression are the factor of interest, the discretionary accrual proxy for any given firm-year. Although this model has gained wide appreciation for standardizing the methodology in accrual-based earnings management research (DeFond. 2010), the model has one significant issue inherent in its assumptions. Under this specification, the modeler assumes that revenues are non-discretionary. In their paper investigating the ability of models to indicate earnings management, Dechow et al. (Dechow et al. 1995) suggest a modified version of the Jones (1991) model, in which the estimation coefficient of revenue is adjusted for the change in the receivables. This adjusted model, which has become known as the "modified Jones model", recognizes that not all changes in the revenues are non-discretionary as management is able to exercise discretion over the receivables and are hence able to manage the published earnings for the year through this. However as noted by Dechow et al. (1995), all these models consistently suffer from two issues. First, all models generate tests of low power for the use of earnings management of plausible magnitudes. This indicates that when applying these models to real world settings, the ability of the models to correctly identify cases of earnings management is rather low.

Second, all models are misspecified when applied to a sample of firms with extreme financial performance. According to Dechow et al. (1995.), this finding can raise two interpretations. First, it might be that the earnings performance is correlated with the error in measuring Discretionary Accruals. A second interpretation is that the earnings performance is correlated with other variables that cause the use of earnings management (Dechow et al. 1995).

Recently, to improve the predictive ability of the accrual models regarding the use of earnings management by Dechow et al. (2012) a new approach to detecting earnings management has been introduced. The authors use a property unique to the use of discretionary accruals, in that if accruals do not reflect the underlying economic activity their effect has to ultimately reverse in other periods. For example, if management of a firm decides to manage the published earnings by increasing the recognized revenue for this period without generating additional revenues, it has to 'borrow' revenues from other periods. As an effect, in other periods the firm has to decrease revenues by the exact same amount. This effect is unique to the management discretion, as normal accruals reflect a change in the operating environment of the firm. Since firms are considered to operate in a continuous fashion, and their operating characteristics will tend to persist over time, the reversal of the normal accruals will continually be offset by a new abnormal accrual to net-out to a zero level (Dechow et al. 2012). Considering this discrepancy in the reversal between the discretionary and the non-discretionary accruals, testing for the reversal should increase the power of tests for the use of earnings management, as well as mitigate the misspecification of the correlated non-discretionary accruals (Dechow et al. 2012). For computational reasons, the authors investigate short-term accruals only; however their theory is hypothesized to hold for long-term accruals as well.

Individual accrual accounts

In order to mitigate issues associated with measuring the use of earnings management through aggregate accruals, a stream of research has developed aimed at analyzing the individual accruals accounts to find possible use of earnings management. This section will comment on such approaches, and compare their usefulness within the scope of this research compared to the aggregate accruals analysis.

McNichols (2000) proposes three advantages to using individual accrual accounts over aggregate accrual models. First a researcher can exercise his knowledge of what drives specific accrual accounts better than he or she would be able to, based on an aggregate accrual model. Second, using specific accruals allows for deploying a model in specific industries

where this account is deemed to be material and under discretion. Third, specific accrual models allow for an investigation between the accrual and the factors driving this accrual are more reliable, as aggregation would create estimation biases assuming that different accrual accounts relate differently to a common explanatory factor (McNichols. 2000). However the author poses three disadvantages to the use of specific account models. First, the investigator needs to have reliable evidence that the account is subject to discretion. Second, specific account models require more institutional knowledge and data, consequently these models are more costly to implement. Third, the amount of firms that might use a particular accrual account might be small compared to the number of firms with aggregate accruals (McNichols. 2000); consequently the generalizability of the results is difficult or even impossible. The author found numerous examples of researches conducted on loan loss revision in the banking industry (E.g. Moyer. 1990; Wahlen 1994), or relating to loss reversion in the insurance industry (E.g. Petroni. 1992; Nelson. 2000), where the setting allowed for better predictions by the individual accrual account models. However, these researches all relied on industry specific accounts; consequently it is impossible to generalize the results.

Stubben (2009) argued for the use of discretionary revenue recognition as an individual accrual account in the earnings management research. He argues that revenue recognition is an issue for a large number of industries, it is per construct subject to discretion, and the author found that a significant number of SEC Accounting and Auditing Enforcement Releases (70%) involved misstated revenues. The author models the receivable accrual as a function of the change in the revenues, rather than aggregate accruals as a function of the revenues. This different approach provides more reliable and less biased results than the aggregate accrual models, both in a set of simulations as well as in a real-life setting where the models were compared in their ability to predict the SEC enforcement cases. Considering the objective of this thesis to investigate the difference in tolerance of earnings management between genders, this thesis suggests making use of the revenue recognition accrual. This selection is based on the fact that discretionary revenue recognition is a risky choice, and requires a level of confidence in the ability of the firm to actually generate the revenue in later time periods. These characteristics were assumed to be present in different degrees in both genders, making this accrual suitable for the objective of this thesis. Moreover, as this accrual is likely to be present and material across many industries (Stubben. 2010), this allows for more generalizable results across different firms.

2.5. Theoretical relation between constructs

This section is the summary of the previous sections. Moreover, the previous sections will be cast into a broad model, which will be further specified in chapter three. The goal of this thesis is to identify an association between the board characteristics and the use of earnings management. This relation is assumed by the task of the board, which is to monitor the management practices and ensuring that these practices are in accordance with the objectives of the stakeholders of the firm. Based on the differences in behavior as presented in section 2.3, the board characteristics are operationalized by discerning the board members by gender. If board members of different genders indeed provide a different lens through which the board views the operations of the firm, then it is plausible that differently composed boards condone management practices relating to the use of earnings management to different degrees. The earnings management construct is operationalized by means of discretionary revenue recognition by the firm. This thesis opts for the approach of using an individual accrual account to operationalize earnings management over other approaches, as it has been argued in previous sections that the individual account allows this thesis to more accurately establish an association between gender and the use of earnings management than other conventional methods would allow. Chapter three will present a review of prior literature on the topic of gender diversity and earnings management. Additionally, chapter three will present the use of individual accrual accounts over aggregate accounts. Chapter three will conclude with the presentation of the testable hypotheses for this thesis.

3. Literature review and hypotheses development

This section will extensively present recent academic literature relating to the subject of gender diversity and the use of earnings management. The goals of this section are to indicate previous findings of other authors relating to the topic, as well as indicating which potential pitfalls need to be accounted for. Moreover, this section aims to indicate the ways in which this thesis differentiates itself from prior research in this field. All these factors will culminate in the final subsection, where the testable hypotheses will be presented.

3.1. Literature review

Gender diversity and earnings management.

Krishnan and Parsons (2008) conducted research concerning the relation between the quality of the reported earnings and the percentage of women in senior ranks. The authors used a sample of S&P 500 firms between 1996 and 2000 from the Catalyst database, which ranked the firms from high- to low percentage of female senior members. The authors used the top- and bottom quartile of this ranking, which represent the firms with the highest- and lowest percentages of female senior members, as the difference in female representation is the largest between these two groups. The authors conducted a series of between-groups difference tests to investigate the association between the diversity of senior members and the following earnings quality measures: Asymmetric timeliness, Earnings skewedness, Accrual-based conservatism, loss-avoidance tendency, and persistence of earnings. The authors found that high-diversity firms scored more desirable on all measures of earnings quality, even after controlling for firm-size effect where the only notable difference found was that low-diversity firms were no longer statistically significantly related to the asymmetric timeliness measure, while the high-diversity firms were more strongly related to this measure. This particular research differentiates itself mainly due to the expressive testing of between-group variances, as well as the various constructs of earnings quality used. However there appears to be a lack of control variables, accounting for known associations to earnings quality. The authors only expressively signaled controlling for omitted correlated variables when testing for the association between asymmetric timeliness of the published earnings and the gender diversity. In the models used for the remaining tests, no expressive mentioning of control variables occurs. This apparent lack of control variables could pose a risk of misstated association between the dependent and independent variables used. In addition, the research uses a

sample of firm-year observations between 1996 and 2000, a period pre Sarbanes Oxley Act (SOX). Considering the vast changes in the financial reporting regulations instilled by the SOX act, the transferability of results to more current periods is questionable.

Peni and Vähämaa (2010) investigated the association between the use of earnings management and the gender of the executives of the firm. In a sample consisting of the firms in the S&P 500 index as of 31st of December 2007 and counting backwards five years, the authors investigate the association between the gender of the CEO and the CFO of a firm and the quality of the accrual estimation error as by Dechow and Dichev (2002) and the modified version of this model as introduced by McNichols (2002). To test whether the gender of the CEO or the CFO associates to the use of income-decreasing discretionary accruals, the Authors use multiple panel regressions. The authors chose this approach to avoid misspecification of the gender variable as well as the sensitivity of the model to accrual specifications.

The authors find that the gender of the CFO of a firm is significantly associated to the use of discretionary accruals in that female CFOs are more likely than their male counterparts to use income-decreasing accruals. Such an association is not found for the CEO of a firm, a finding that the authors explain through the significantly larger contribution to the financial reporting process by the CFO than by the CEO of a firm. This research uses control variables for known drivers of financial reporting quality, such as board size and independence (the ratio of outside directors to inside directors), the audit committee size and independence, and measures to control for possible firm size effects. All findings in this research were robust to these checks, indicating that the observed association between CFO gender and the use of income decreasing discretionary accruals were not due to other known drivers of financial reporting quality. As most research in this field, the authors note that because of data availability the results are based on large US listed firms only, and consequently cannot directly be transferred to smaller firms or different geographical areas.

Sun et al. (2011) conducted research concerning the association between female presence on independent audit committees and the use of earnings management. The authors hypothesized that, when women behave more ethically and in a more risk-averse manner, their presence on the independent audit committees should constrain the earnings management activities. In conformity to common practice in this field of research, the authors selected S&P 500 index firms for their research, in this instance: observations in the period 2003-2005. The authors make use of the model as introduced by Jones (1991) to estimate the discretionary accruals as

the estimation error of this model, which are then used as the dependent variable in the regression models to estimate the effects that the female member on the independent audit committee have on the earnings management activities. Subsequently, the authors match the firm-year observations to observations within the same industry and with similar Return On Assets (ROA) in order to account for the effect that performance has on earnings management, in conformity with the findings in Kothari et al. (2005). In their regression model, the authors regress the previously calculated discretionary accruals against the female director presence on the independent audit committee, subject to a number of control variables known to associate with the use of discretionary accruals. Their findings do not find any evidence suggesting an association between the female presence on the independent audit committees and the use of discretionary accruals, a finding that is contradicting to findings by other researchers. The authors argue that because the use of earnings management in itself is neither illegal nor unethical the hypothesized characteristics of female directors do not always have to lead these directors to raise a protest against the use of earnings management activities. In addition, the authors suggest that female directors may not always desire to, or are not always able to, convince the other committee members of their opinion, a finding in conformity with the "critical mass" conditions as introduced by Joecks et al. (2013). Any combinations of these two factors would lead to observed null results while female directors would have a different opinion towards the use of earnings management activities than their male committee colleagues would.

Ye et al. (2010) investigated whether an observable difference exists in the association between executives of different genders and the quality of reported earnings by Chinese listed firms. The authors immediately pose an advantage to research on Chinese listed firms, as Chinese Generally Accepted Accounting Principles require full disclosure on board composition in the annual reports of listed firms. This requirement makes information on board composition more transparent than in the U.S. and by European firms, as data for these markets is collected by external parties, such as Catalyst (Ye et al. 2010). The authors used a sample of all firms listed on the Chinese market between 2001 and 2006 with sufficient financial information. The authors conducted cross-sectional regression analyses on the association between the gender of executives; in this case the CEO, the CFO, and the Chair of the board, and the quality of the reported earnings as measured by: the ability of the reported earnings to predict future cash flows, the association between the reported earnings and the stock returns, and the absolute magnitude of discretionary accruals used by the firms.

Concerning the discretionary accruals regression, to estimate the discretionary accruals used by the firms the authors used the model from Jones (1991). The research brought interesting observations, the authors were not able to find a significant association between the gender of the executives and the quality of the reported earnings, a finding that is in contrast with the findings in US settings. The authors believe that a possible explanation for this finding is that the socialist values in China weigh very strongly on the executive behavior, and consequently create similar behavior between male and female executives. This explanation in addition is in conformity with the nurture argument as stated in the "nature vs. nurture" theory as presented by Talmud and Izraeli (1999). The "nurture" argument states that observed behavior by members of each gender is caused by the different societal norms and upbringing for each of the genders, rather than that these traits are inherit by biological differences.

Srinidhi et al. (2011) investigated whether a positive association exists between female participation on corporate boards and the quality of the reported earnings. Using 2480 firm-year observations of listed firms in the United States between 2001 and 2007, the authors investigated whether female participation on the corporate boards is associated with the quality of the discretionary accruals, as well as whether the female participation on corporate boards is associated with the firms narrowly beating analyst benchmarks or whether a firm reports earnings surprises. To investigate the association between the female participation and the discretionary accruals, where the discretionary accruals are obtained from the model of McNichols (2002), the authors used a cross-sectional regression analysis. To test whether female participation associates with the beating of benchmarks or the reporting of earnings surprises, the authors define beating the benchmark as an observation in which the selected firm meets or beats an established benchmark such as the reported earnings of the previous year or the analyst forecast. Earnings surprises are defined as a firm meeting or beating the previous month analyst forecasted earnings per share by less than one cent. These conditions are then modeled in a conditional logistics regression model (Logit) against the female participation on the board. The authors found a positive association between the female participation on the boards and the accruals quality, and a negative association between the female participation and the earnings surprise and benchmark variables. Both of these findings imply that female participation on corporate boards is associated with higher quality reported earnings. The research differentiates itself by the inclusion of beating benchmarks and reporting of earnings surprises, events frequently associated with earnings management activities. In contrast to the frequently used discretionary accruals proxies, these actions by

firms allow for a more direct association with the intention by the board members. In contrast, the discretionary accrual proxies are generally a highly aggregated number, consequently it is difficult to infer intend by the executives from.

Thiruvadi and Huang (2011) investigate whether gender diversity on audit committees has a significant impact on the earnings management activities of a firm. Using a sample of 299 firms from the S&P small cap 600-index from the year 2003 with firms matched to a control firm within the same industry and similar performance, the authors conduct a cross-sectional regression analysis with a discretionary accrual proxy from the model introduced by Ashbaugh et al. (2003). After controlling for known correlated variables, the authors found that female presence on audit committees constrains earnings management activities by increasing the use of negative, read: income decreasing, discretionary accruals. These findings contradict the findings of Sun et al. (2011), who found no association between the female presence on the audit committees and the earnings management activities.

A number of differences between the two researches can be noted. First, both researches specify discretionary accruals differently, with Sun et al. using the model of Jones (1991) and Thiruvadi and Huang using the Ashbaugh et al. (2003) model. Second, two differences in the sample selection are available. Sun et al. (2011) use a sample of S&P 500 firms, which are large-cap firms, whereas Thiruvadi and Huang (2011) use a sample of S&P small cap 600 firms. It has been theorized that because larger firms are more subject to media and to analyst exposure, these firms are faced with an incentive to appoint female directors as an act of tokenism (Conley et al. 2009). In this case, tokenism is defined as situations in which women are appointed to high-ranking positions to comply with external ethical believes, but these appointed women remain largely underutilized in decision making activities. If this theory hold true, it would serve as an explanation as to why research on larger firms yields no statistically significant association, while research on smaller firms in fact does yield statistically significant results. In addition, the research by Sun et al. (2011) uses a timeframe of three years concerning their sample, while Thiruvadi and Huang select their sample from the year 2003 only. This sample is smaller, with 299 observations compared to the 525 observations in Sun et al. (2011). This could leave the smaller sample more subjected to statistical outliers, as well as effects relating to the time period. Third, the research by Thiruvadi and Huang defines only income increasing discretionary accruals as earnings management activities, whereas Sun et al. (2011) define both income increasing- and income decreasing discretionary accruals as earnings management activities. This difference would

allow certain income decreasing earnings management activities such as "cookie jar accounting", where reported income is intentionally understated to build up buffers for worse times, to go unnoticed. Considering that gender theory states that women tend to be risk-averse and less confident than men, it is possible that female presence associated with income decreasing discretionary accruals are in fact engaging in earnings management activities and hence not constraining these activities.

Abbott et al. (2012) investigate whether the presence of female board members is associated with the likelihood of a financial restatement. The authors compose their sample from the U.S. General Accounting Office (GAO) report on restatements of 2002. The authors used a matched-pair sample, where the 278 restatement firms are matched with a control firm with a market value of equity within 30% of that of the restatement firm. To find whether female board member presence shows an association with firms having restated their annual reports, the test conducted is a conditional logistics regression (Logit). After controlling for whether a firm was Big-n audited or not, the authors found that firms with at least one female board member present were significantly less likely to have restated their annual reports. Because of the sample the research mainly differentiates itself. The sample used is based on firms that were reported to have restated their financial statements, an event most frequently initiated by erroneous managerial discretion. Hence, if female board member presence shows a low association with such a restatement, relatively direct evidence of gender based managerial differences is presented. Additionally, the sample used consists mostly of smaller firms. This is in contrast to the majority of researches that because of data availability focuses on large firms. The authors note that, while close to 90% of S&P 500 firms had at least one female director in 2002, the percentage of firms with at least one female board member in their sample was less than 30% for both the restatement firms as their control firms. The authors argue that since smaller firm feel less external pressure to appoint female directors because of less exposure to media and analysts, the women appointed in their sample firms are less likely to be appointed because of tokenism (Conley et al. 2009), and are consequently more likely to fully act as board members.

Ho et al. (2015) investigate whether the use of accounting conservatism is positively associated with the presence of a female CEO. The authors hypothesize that if female executives are in fact more risk averse and less confident than their male counterparts, firms with a female CEO should show more conservative accounting practices than firms headed by

a male CEO. In addition, the authors pose that this association should be more pronounced in industries with high litigation and/ or takeover risk as these more risky environments likely reinforce the more conservative mindset of the female CEO. In a large sample of US firms between 1996 and 2008, the authors compose a sample of 13,206 firm-year observations, consisting firms with total assets and total sales of at least $10 million, excluding financial institutions. The authors conduct a cross-sectional regression analysis, with total accruals from a firm as the dependent variable, and Cash flow From Operations (CFO), Negative Cash flows From Operations (NCFO) and Female CEO variables are used as interaction variables.
The authors found that firms with a female CEO indeed show more conservative accounting practices than firms lead by a male CEO, and that this association is stronger in an environment with high litigation and/ or takeover risk. These findings contradict the findings of Peni and Vähämaa (2010), who found that while the gender of the CFO associated with more conservative accounting practices, no such association was found for female CEOs. Peni and Vähämaa (2010) note that their lack of observed association between the gender of the CEO and the use of negative discretionary accruals was due to the limited role in the financial reporting process by the CEO compared to that of the CFO. Considering that Ho et al. (2015) do not explicitly model the gender of the CFO, this possible discrepancy may have gone unnoticed in their research when compared to that of Peni and Vähämaa (2010).

Discretionary revenue recognition.

Marquardt and Wiedman (2004) investigate whether specific accruals are associated with specific events that are commonly associated with earnings management. More specifically, the authors investigate how earnings are managed in the event of equity offering, management buyouts or when firms wish to avoid earnings decreases. The authors posed that when a firm is planning on issuing new equity, it has an incentive to manage their reported earnings upwards, most likely by accelerating reported revenues, while firms facing a management buyout have an incentive to manage earnings downwards, most likely by postponing revenue recognition. Since accelerated revenue recognition is not necessarily related to actually received cash, the authors argue that such earnings management activities will be reflected in the accounts receivable of a firm. As the costs associated with earnings management activities on recurring balance sheet items are high, firms will tend to avoid these activities in events with lower incentives such as earnings decrease avoidance. The authors argue that in such events, firms are more likely to manage reported earnings through nonrecurring items of the balance sheet. The authors define the unexpected portion of the accounts receivable as the

difference between the accounts receivable balance sheet item and the ending balance of the accounts receivable of the prior year adjusted for current year sales. Indeed, the authors find that firms in the process of issuing new equity have significantly high positive levels of unexpected accounts receivable, while firms that are facing management buyouts have high significantly high levels of negative unexpected accounts receivable. These findings imply that management indeed manages reported earnings through discretionary revenue recognition. However the authors note an existing duality in literature on earnings management through accruals, which is the trade-off in aggregate accruals versus the use of individual accrual accounts. The authors argue that since firms have multiple options to manage reported earnings, using individual accrual accounts to test for cases of earnings management could omit cases of earnings management where management uses their discretion on accrual accounts other than those investigated by the researchers. On the other hand, using aggregate accruals for earnings management research would not yield the researcher any evidence on how firms managed their reported earnings.

To test whether individual accrual accounts possess more power in detecting earnings management cases, Stubben (2009) investigated whether a model using discretionary revenue recognition would outperform the widely used aggregated accruals models such as Jones (1991), and Dechow and Dichev (2002), in detecting both simulated scenarios of earnings management as well as real life scenarios of earnings management as reported by the SEC. The author argues that aggregate accrual accounts are influenced by non-discretionary elements, such as an increase in inventory costs caused by increased sales volume, and hence suffer from misspecification. The author notes that if a firm manages reported earnings using their discretion, it does so through individual accounts, hence investigating the association between such accounts and earnings management would lead to more accurate predictions of earnings management cases. In order to conduct research on a large scale, the individual account must satisfy three conditions. First, it must be an accrual common across industries. Accounts such as loss reversal in the insurance industry are not present in the retail industry and hence findings based on this account cannot be transferred to other industries. Second, the accrual must be subject to management discretion. Finally, the accrual must represent a large portion of the earnings discretion available to the firm (Stubben. 2009). The author notes that the accrual most suited for earnings management is revenues. The author models discretionary revenue as the difference between the change in Accounts receivable over a period and the change in non-discretionary revenues over the same period. To control for

deviations caused by differing credit policies implemented by firms, the authors incorporates variables that are known to associate with credit policies, namely firm size, firm age, industry-median adjusted growth rate, and industry-median adjusted gross margin. Indeed, the author finds that the model using discretionary revenue recognition is more powerful in predicting cases of earnings management than models using aggregate accruals. Additionally, the aggregate accruals model do not significantly outperform the discretionary revenue model in detecting cases of expense discretion both in the simulated revenue and expense manipulation as well as the firms subject to expense related SEC enforcement actions. These findings suggest that using individual accrual models to detect earnings management cases is more desirable than using aggregate accrual models.

3.2. Hypotheses development

This thesis aims to contribute to the body of literature relating to gender diversity and reported earnings quality in the following ways. First, by modeling a broad discretionary accruals proxy the majority of the body of researches investigates associations between the female board presence and the reported earnings quality. However in order to investigate the difference in tolerance for the use of discretionary accruals, this thesis aims to investigate a single instance of discretionary accruals use. More specifically, this thesis will investigate whether an association can be found between female board presence and the discretionary revenue recognition. The contribution of this setting to the existing body of literature is twofold. First, the proposed setting allows for finding evidence of differing tolerance levels regarding a form of discretionary accruals that is less influenced by the presence of non-discretionary accruals. This implies that the findings will suffer less from statistical noise than in models using an overall proxy of discretionary accruals and allows for conclusions regarding board member characteristics more. Second, whereas the majority of the researches investigates the association between measures of conservative earnings reporting, the discretionary revenue recognition can be considered as a measure influenced by aggressive financial reporting practices, essentially measuring the other end of the conservatism and aggression scale.

In addition, this thesis differentiates itself in the way that gender diversity on corporate boards is specified. The majority of the available scientific literature does not take into account the "critical mass" condition as introduced by Joecks et al. (2013), which states that the minority in a group environment does not feel comfortable exhibiting their natural characteristics unless this minority is sufficiently represented. In the case of female board presence, this

would imply that women would not feel comfortable expressing their natural behavior unless they are represented alongside a minimum of other women. This thesis aims to investigate the validity of this theory by examining the difference in tolerance towards aggressive discretionary revenue recognition between boards with differing levels of female presence. More specifically, this thesis aims to investigate the next hypotheses:

HI

A negative association exists between female board presence and the magnitude of discretionary revenue recognition.

H2

The negative association between female board presence and the magnitude of discretionary revenue recognition becomes more pronounced with an increased percentage of female board members.

H3

The negative association between female board presence and the magnitude of discretionary revenue recognition becomes more pronounced when the female presence on the board is at least 30%.

To summarize, this thesis will investigate whether an association exists between the presence of female board members and the magnitude of discretionary revenue recognition in firms. Prior literature focusing on aggregate accruals found an association between female board presence and the use of earnings management activities in United States firms. However research conducted on firms from China found no significant association between female board presence and earnings management activities (Ye et al. 2010). Since it is difficult to infer intention from highly aggregated accruals numbers, this thesis will investigate whether an association exists between the female board presence and a single accrual account. This thesis will use discretionary revenue recognition (Stubben. 2009), as the level of engagement in these activities largely depends on the confidence and aggressiveness of the decision makers, two characteristics widely recognized to be present in different levels between men and women. In addition, this thesis will incorporate a critical mass condition (Joecks et al. 2013), as organizational literature found that for the minority of a group to feel comfortable acting as their true selves, they need a minimum representation in the group. As women are

still the minority representation in boardrooms, the critical mass states that for women to feel comfortable exerting their different characteristics need to occupy at least 30% of the board positions.

Chapter four will present the statistical models used to test for the existence of an association between female board presence and the magnitude of discretionary revenue recognition. This presentation will also list the variables used to control for other factors known to associate with earnings management activities. Chapter four will also present the sample used in this thesis.

4. Model and data

This chapter will present the models used to test the hypotheses as introduced in chapter three, on the association between the female board presence and the magnitude of the discretionary revenue recognition. This thesis will use a cross-sectional regression method to estimate a proxy for discretionary revenue recognition. These proxies will serve as the dependent variables in three further regressions, which will test whether or not an association can be observed between female board presence and discretionary revenue recognition. After the models are presented, this chapter will continue with the presentation of the data used in the models. Finally, this chapter will comment on the regression outcomes of the revenue model and the conditional revenue model, as these models are used to generate the dependent variables for the main regressions and are consequently related to the data gathering process.

The discretionary revenue recognition for a firm will be derived using the models of Stubben (2009). The author argues that for any firm, reported Accounts Receivable during a year consists of actually generated credit revenues and possibly reported earnings arising from the discretion by the management. This implies that the change in the Accounts Receivable in a scenario without managerial discretion is a direct result of changes in the Revenues generated by the firm. Based on this assumption, any difference between changes in the Accounts Receivable and changes in reported revenues are likely due to managerial discretion. Since actual credit revenues in the beginning of the year are likely to reverse within that same year, while actual credit revenue generated in the later stages of the year are likely to be collected in a subsequent reporting period, the author separates revenues generated in the first three quarters of a year from those revenues generated in the fourth quarter. Hence, the association between the Accounts Receivable and the generated revenues is presented in the following function:

$$AR_{i,t} = \alpha + \Delta R\_3_{i,t} + \Delta R4_{i,t} + \epsilon_{i,t} \quad (1)$$

$AR_{i,t}$	Accounts Receivable for firm i in year t, scaled by average total assets
α	Intercept
$\Delta R\_3_{i,t}$	Revenues reported through the first three quarters by firm i in year t, scaled by average total assets
$\Delta R4_{i,t}$	Revenues reported in the fourth quarter by firm i in year t, scaled by average total assets
$\epsilon_{i,t}$	The error term of the regression, in this case the proxy for discretionary revenue recognition by firm i in year t

The author however notes that this model implicitly assumes that all firms adhere to the same revenue generating process by not allowing for deviations caused by differing credit policies. To control for this effect, the author proposes a conditional revenue model that factors variables known to associate with credit policies into the function, as presented in equation (2).

$$\Delta AR_{i,t} = \alpha + \beta_1 \Delta R_{i,t} + \beta_2 \Delta R_{i,t} X\ SIZE_{i,t} + \beta_3 \Delta R_{i,t} X\ AGE_{i,t} + \beta_4 \Delta R_{i,t} X\ AGE\_SQ_{i,t} + \beta_5 \Delta R_{i,t} X\ GRR\_P_{i,t} + \beta_6 \Delta R_{i,t} X\ GRR\_N_{i,t} + \beta_7 \Delta R_{i,t} X\ GRM_{i,t} + \beta_8 \Delta R_{i,t} X\ GRM\_SQ_{i,t} + \epsilon_{i,t} \quad (2)$$

$\Delta AR_{i,t}$	Accounts Receivable for firm i in year t, scaled by average total assets
α	Intercept
$\beta_1 \Delta R_{i,t}$	Reported revenues for firm i over the whole year t, scaled by average total assets
$\beta_2 \Delta R_{i,t} X\ SIZE_{i,t}$	Firm size, as measured by the natural logarithm of the total assets of firm in year t
$\beta_3 \Delta R_{i,t} X\ AGE_{i,t}$	Firm age, measured as the difference between the year t of firm i, and the year of the Initial Public Offering (IPO)
$\beta_4 \Delta R_{i,t} X\ AGE\_SQ_{i,t}$	Squared firm age of firm i in year t, to allow for a non-linear relationship between firm age and credit policy
$\beta_5 \Delta R_{i,t} X\ GRR\_P_{i,t}$	Industry-median adjusted growth rate of revenues of firm i in year t, if this adjusted growth rate is zero or positive (firm outperformed the industry median observation)
$\beta_6 \Delta R_{i,t} X\ GRR\_N_{i,t}$	Industry-median adjusted growth rate of revenues of firm i in year t, if this adjusted growth rate is negative (firm underperformed compared to the industry median)
$\beta_7 \Delta R_{i,t} X\ GRM_{i,t}$	Industry-median adjusted gross margin for firm i in year t, as measured by the difference between reported revenues and Costs of Goods Sold (COGS)
$\beta_8 \Delta R_{i,t} X\ GRM\_SQ_{i,t}$	Squared of the industry-median adjusted gross margin, to allow for a non-linear association between gross margin and credit policy
$\epsilon_{i,t}$	Error term, in this case the proxy for the discretionary revenue recognition by firm i in year t

Concerning the hypotheses used in this thesis, both models will be used to estimate the discretionary revenues component. To test H1 stating that an association exists between the female board presence and the magnitude of the discretionary revenue reporting, this thesis will use the following model:

$$DR = \alpha + \beta_1 Female + \beta_2 LNSize + \beta_3 CEOCHAIR + \beta_4 LTGTN + \beta_5 LEVERAGE + \beta_6 MB + \beta_7 LOSS + \epsilon \quad (3)$$

DR	Discretionary Revenue recognition, as derived from equation (1) or (2)
α	Intercept
$\beta_1 Female$	Dummy variable, with a value 1 if the firm has at least one female director, 0 otherwise
$\beta_2 LNSize$	Natural Logarithm of the total assets
$\beta_3 CEOCHAIR$	Dummy variable with value 1 if the firm CEO also serves as the chair of the Board, 0 otherwise
$\beta_4 LTGTN$	Dummy variable with value 1 if a firm operates in a high litigation industry, 0 if otherwise (High litigation industry codes are: 2833-2836, 3570-3577, 3600-3674, 5200-5961, 7370-7374) (Ashbaugh et al. 2003)
$\beta_5 LEVERAGE$	Total assets / (Total assets- total liabilities)
$\beta_6 MB$	Market value of assets / book value of assets
$\beta_7 LOSS$	Dummy variable with value 1 if the firm reports a negative Earnings before Interest, Tax, Depreciation and Amortization (EBITDA), 0 otherwise
ϵ	Error term

In order to test H2, stating that the presence of female board members relative to the number of board positions associates with the discretionary revenue reporting, this thesis will use the following model:

$$DR = \alpha + \beta_1 Female\% + \beta_2 LNSize + \beta_3 CEOCHAIR + \beta_4 LTGTN + \beta_5 LEVERAGE + \beta_6 MB + \beta_7 LOSS + \epsilon \quad (4)$$

DR	Discretionary Revenue recognition, as derived from equation (1) or (2)
α	Intercept
$\beta_1 Female\%$	Percentage of total board position in the firm, held by female directors
$\beta_2 LNSize$	Natural Logarithm of the total assets
$\beta_3 CEOCHAIR$	Dummy variable with value 1 if the firm CEO also serves as the chair of the Board, 0 otherwise
$\beta_4 LTGTN$	Dummy variable with value 1 if a firm operates in a high litigation industry, 0 if otherwise (High litigation industry codes are: 2833-2836, 3570-3577, 3600-3674, 5200-5961, 7370-7374) (Ashbaugh et al. 2003)
$\beta_5 LEVERAGE$	Total assets / (Total assets- total liabilities)

$\beta_6 MB$	Market value of assets / book value of assets
$\beta_7 LOSS$	Dummy variable with value 1 if the firm reports a negative Earnings before Interest, Tax, Depreciation and Amortization (EBITDA), 0 otherwise
ϵ	Error term

Finally, in order to test H3 stating that for female members of the board to fully exert their natural behavior they need to be represented by a minimum of other female board members, this thesis will use the following model:

$$DR = \alpha + \beta_1 Female\% + \beta_2 Critmass + \beta_3 Female\%XCritmass + \beta_4 LNSize + \beta_5 CEOCHAIR + \beta_6 LTGTN + \beta_7 LEVERAGE + \beta_8 MB + \beta_9 LOSS + \epsilon \quad (5)$$

DR	Discretionary Revenue recognition, as derived from equation (1) or (2)
α	Intercept
$\beta_1 Female\%$	Percentage of total board positions held by Female directors
$\beta_2 Critmass$	Dummy variable with value 1 if percentage of board positions held by women is at least 30%, 0 otherwise
$\beta_3 Female\%XCritmass$	Interaction variable, value of the percentage of total board positions held by female directors if this is larger than 30%, zero otherwise
$\beta_4 LNSize$	Natural Logarithm of total assets
$\beta_5 CEOCHAIR$	Dummy variable with value 1 if the firm CEO also serves as the chair of the Board, 0 otherwise
$\beta_6 LTGTN$	Dummy variable with value 1 if a firm operates in a high litigation industry, 0 if otherwise (High litigation industry codes are: 2833-2836, 3570-3577, 3600-3674, 5200-5961, 7370-7374) (Ashbaugh et al. 2003)
$\beta_7 LEVERAGE$	Total assets / (Total assets- total liabilities)
$\beta_8 MB$	Market value of assets / book value of assets
$\beta_9 LOSS$	Dummy variable with value 1 if the firm reports a negative Earnings before Interest, Tax, Depreciation and Amortization (EBITDA), 0 otherwise
ϵ	Error term

Data for this thesis is gathered through Wharton Research Data Services (WRDS), using the Compustat database for financial data and the Institutional Shareholder Services (ISS, previously Risk Metrics) director database for data concerning the board composition. The initial sample consist of firms listed on the S&P 1500 super composite index, which is composed from the S&P 500 large-cap, S&P 400 mid-cap, and the S&P 600 small-cap index, as of the 31st of December 2014. Using a timeframe from the 1st of January 2007 through the 31st of December 2014, the initial sample consisted of 10.600 firm-year observations. A number of steps were performed to reduce the sample by eliminating observations which were

incomplete or whose financial reporting requirements did not fit with the assumptions made for this sample (financial services and insurance firms). These steps were conducted in the following order.

Sample size prior to exclusion	***Ground of exclusion***	***Observations deleted***
10,600	Incomplete financial data	2,370
8,230	Incomplete director data	396
7,834	Financial services and insurance firms	4,347
3,487	Unable to identify firm age	791
	Final sample revenue model	
	2,696	
2,696	Incomplete growth data	690
	Final sample conditional revenue model	
	2,006	

To test for the presence of outliers, this thesis first establishes the interquartile range of the accounts receivable variable in both the revenue- and the conditional revenue model. The lower bound is computed as the first quartile minus 1.5 times the interquartile range (-0.10 for the revenue model, -0.09 for the conditional revenue model), while the upper bound is computed as the third quartile plus 1.5 times the interquartile range (0.35 for the revenue model, 0.34 for the conditional revenue model). The following table describes the impact of excluding outliers on the samples used.

Revenue model		**Conditional revenue model**	
Original sample	*2696*	Original sample	*2006*
Outliers	*109*	Outliers	*76*
Final sample	*2587*	Final sample	*1930*

Visual inspection of the histograms of the accounts receivable, revenue_3 and revenue 4 variable showed significant skewedness in the distributions of these variables, which this thesis mitigates by applying a square root transformation to the accounts receivable variable and the revenue_3 variable, and a natural logarithm transformation to the revenue 4 variable. Visual inspection of the histograms post transformation confirmed that the distributions sufficiently approach normality. This process of visual inspection and transformation where needed is applied to all variables across all models used in this thesis. Please refer to appendix 2 for histograms of all variables as implemented in the regressions. Table 1 provides the essential descriptive statistics as well as the correlation coefficients for the variables in the revenue model. For complete tables on descriptive statistics, please refer to appendix 3.

Revenue model	***Sqrt defl Accounts rec.***	***Sqrt Revenue_3***	***LN Revenue4***
Mean	0,34	0,84	-1,44
St. Error	0,00	0,00	0,01
St. Dev.	0,11	0,24	0,57
Correlations			
Sqrt defl Acc rec.	1		
Sqrt Revenue_3	0,29	1	
LN Revenue4	0,34	0,90	1

Table 1: Descriptive statistics and correlations Revenue model

This thesis notes the high correlation coefficient of the reported revenues throughout the first three quarters and reported revenues in quarter 4, however considering the nature of the two variables this outcome is not unexpected. This thesis will test for multicollinearity by calculating the Variance Inflation Factor (VIF) for each independent variable. The VIF value indicates how much larger the variable coefficient would have been had if not been correlated to any of the other independent variables. Although there is a disagreement in the academic literature on which values should be considered when testing for multicollinearity, most of the scientific literature is in agreement that values in excess of 6 should be treated with caution and values in excess of 10 strongly indicate cases of multicollinearity (O'Brien. 2007). From the excel regression tables, VIF is calculated as follows:

$$VIF = (St.Dev_x^2 * Total\ df * St.error_x^2)/MS$$

Here, the standard deviation of x is the standard deviation of the particular variable across all observations. Total degrees of freedom are n-1, where n is the number of observations in the regression. Standard error is the standard error of the particular variable obtained from the regression model. MS is the Mean Square Error, which is calculated as the sum of squared residuals divided by n-1 degrees of freedom. Table 2 provides the regression statistics for the revenue model.

Model					
Adjust. R2	*0.12*				
St Error	*0.10*				
Observations	*2587*				
MS	0.01		**VIF calculation**		
Variables	Coefficient	t-stat	St. Error	St. Dev	VIF
Intercept	*0.51*	*17.62**	--	--	--
Sqr Defl Rev_3	*-0.05*	*-2.67**	*0.02*	*0.24*	*5.66*
LNDefl Rev4	*0.09*	*10.20**	*0.01*	*0.57*	*5.66*

Significance at 1%, 5%, and 10% are indicated with *,**, and *** respectively

Table 2: Revenue model regression statistics and VIF calculation

Table two indicates that all variable coefficients are significantly different from zero at all conventional testing levels. The VIF for the independent variables are equal at 5.66, as there are only two independent variables. Although the value for the VIF is relatively high compared to the values signaled before, the coefficients have differing directions. Moreover, considering that the variables were obtained from quarterly and annually reported revenues, this relatively high VIF does not warrant caution for multicollinearity. The residual from each observation in the regression is considered as the proxy of this model for discretionary revenue recognition, and will serve as the dependent variable in the regressions in the chapter 5.

The un-tabulated results for the VIF analysis on the conditional revenue model regression found that two instances of highly related variables occurred. More specifically, Firm age and the squared firm age variables, as well as Gross margin and the squared gross margin variables had VIF values in excess of 10. Considering the known non-linear relation between firm age and gross margin on accounts receivable (Stubben. 2009), this thesis eliminates the non-squared variables, hence all references to the conditional revenue model from here onwards pertain to the adjusted conditional revenue model. Moreover, visual inspection of the histograms of the distributions showed significantly skewed data for the following variables: Defl. Account rec., Defl Revenue total, Size, and Firm age SQ. Considering the nature of the two variables GRR_P and GRR_N no normal distribution can be obtained as the variable contains an interaction part, while the variable GRM_SQ approaches a uniform distribution. Distribution histograms can be found in appendix 2. Table 3 presents the main descriptive statistics and the correlation coefficients for the conditional revenue model, while table 4

presents the regression statistics for the conditional revenue model, adjusted to eliminate multicollinearity.

Conditional Revenue model	Mean	St Error	St Dev
Sqrt Defl. Account rec	0.34	0.00	0.11
LN Defl Revenue total	-0.10	0.01	0.56
LNSize	16.75	0.03	1.29
LN Firm age_SQ	5.42	0.02	0.83
GRR_P	0.10	0.00	0.27
GRR_N	2.08	0.12	5.45
GRM_SQ	1154.98	316.79	13916.98

Correlations	Sqrt Defl. Account rec.	LN Defl Revenue total	LNSize	LN Firm age_SQ	GRR_P	GRR_N	GRM_SQ
Sqrt Defl. Account rec	1						
LN Defl Revenue total	0.33	1					
LNSize	-0.18	-0.28	1				
LN Firm age_SQ	0.04	-0.06	0.21	1			
GRR_P	0.08	-0.00	0.03	-0.03	1		
GRR_N	0.02	0.04	-0.02	0.02	0.00	1	
GRM_SQ	0.04	0.07	0.17	-0.01	0.00	-0.01	1

Table 3: Descriptive statistics and correlation coefficients for the conditional revenue model

Model					
Adjust. R2	0.13				
St Error	0.10				
Observations	1930				
MS	0.01		VIF Calculation		
Variables	Coefficient	t-stat	St. Error	St. Dev	VIF
Intercept	0.46	13.86*			
LN Defl Revenue total	0.06	13.22*	0.00	0.56	1.10
LNSize	-0.01	-5.41*	0.00	1.29	1.18
LN Firm age_SQ	0.01	3.72*	0.00	0.83	1.04
GRR_P	0.03	3.98*	0.01	0.27	1.00
GRR_N	0.00	0.13	0.00	5.45	1.00
GRM_SQ	0.00	1.82***	0.00	13916.98	1.04

Significance at 1%, 5%, and 10% indicated by *,**, and *** respectively

Table 4: Regression statistics and VIF calculation Adjusted Conditional Revenue model

Based on table 4, this thesis observes four variables to be strongly significantly associated with the accounts receivable variable. More specifically: Deflated revenues, firm size, firm age squared, and higher than the industry-median growth rate are significant at the 1% level. Lower than industry-median growth rates show no significant association with accounts

receivable, while the squared industry-median adjusted gross margin is only significant at the 10% level. None of the remaining variables show any signs of possible multicollinearity, with the highest observed VIF value of 1.18 which is significantly below any suggested cautionary values by O'Brien (2007). As with the revenue model, residuals from all observations are saved to serve as the dependent variable for the main regressions as presented in chapter 5. Comparing the model fit of both the revenue model and the conditional revenue model, the conditional revenue model is marginally more apt in explaining the variance than the revenue model with an R2 of 0.13, compared to the R2 of 0.12 of the revenue model. The results of the regressions used to test the hypotheses of this thesis will be presented in chapter 5.

In regression models, a consistently reoccurring issue is that of endogeneity. Formally, an independent variable is endogenous to the model when the values of the variable are correlated to the values of the errors of the model. This thesis will run a regression with the errors as the dependent variable and all independent variables as used in the models as independent variables for all models used. In these new regressions, insignificant t-statistics for the slope coefficients indicate that the variables are not endogenous to the model, hence if all t-statistics are insignificant the model will stand as presented. Table 5 below presents the endogeneity tests for the revenue model and the conditional revenue model in panel A and in panel B respectively

Adj. R Square	*0.00*	
Observations	*2586*	
	Coefficient	**t-Statistic**
Intercept	*0.00*	*0.00*
Sqrt Defl Rev_3	*0.00*	*0.00*
LNDefl Rev4	*0.00*	*0.00*

Panel A: Revenue model

Adj. R Square	0.03	
Observations	1930	
	Coefficient	**t-statistic**
LN Defl Revenue total	-0.01	-4.31*
LNSize	0.00	-0.76
LN Firm age_SQ	0.00	1.02
GRR_P	0.00	-0.55
GRR_N	0.00	0.50
GRM_SQ	0.00	-6.31*

Panel B: Conditional revenue model

Table 5: *endogeneity analysis for the revenue and conditional revenue model*

Panel A indicates that the both independent variables in the revenue model are not significantly correlated with the errors of the model, indicating no issue regarding endogeneity is present in the revenue model. However as per panel B, two of the variables in the conditional revenue model are significantly correlated to the errors of the model, indicating that the conditional revenue model suffers from endogeneity issues. Stubben (2009) did not present tests for endogeneity, hence the predictive power for both models to correctly specify cases of discretionary revenue recognition cannot be demonstrated, and are even put into question by the endogeneity cases in the conditional revenue model. Considering that validating the conditional revenue model exceeds the scope of this thesis, from here on this thesis will only use the revenue model, as there is no evidence of endogeneity present in this model.

Table 6 and table 7 below provides the main descriptive statistics and correlations from the variables used in the main regressions of this thesis respectively. For the histograms describing the distributions of these variables, please refer to Appendix 2, while the complete descriptive statistics- and correlation tables are be presented in Appendix 3.

	Mean	St. Error	St. Dev
DR	*0.00*	*0.00*	*0.10*
Female	*0.62*	*0.01*	*0.49*
Female%	*0.10*	*0.00*	*0.10*
Critmass	*0.04*	*0.00*	*0.19*
Female%*Critmass	*0.01*	*0.00*	*0.07*
LNSize	*16.64*	*0.03*	*1.29*
CEOChair	*0.07*	*0.01*	*0.26*
Litigation	*0.31*	*0.01*	*0.46*
LNMarker to book	*0.19*	*0.01*	*0.75*
LOSS	*0.03*	*0.00*	*0.17*

Table 6: *Summary of descriptive statistics for regression (3) (4) and (5)*

	DR	Female	LNSize	CEOChair	Litigation	LNMarket to Book	LOSS
DR	*1*						
Female	*-0.15*	*1*					
LNSize	*-0.11*	*0.27*	*1*				
CEOChair	*0.02*	*0.01*	*0.02*	*1*			
Litigation	*-0.26*	*-0.02*	*-0.04*	*0.00*	*1*		
LNMarket to Book	*0.01*	*-0.02*	*-0.24*	*-0.01*	*0.19*	*1*	
LOSS	*-0.07*	*-0.06*	*-0.07*	*-0.02*	*0.04*	*-0.12*	*1*

	DR	Female%	LNSize	CEOChair	Litigation	LNMarket to Book	LOSS
DR	*1*						
Female%	*-0.15*	*1*					
LNSize	*-0.11*	*0.22*	*1*				
CEOChair	*0.02*	*0.02*	*0.02*	*1*			
Litigation	*-0.26*	*-0.03*	*-0.04*	*0.00*	*1*		
lMarket to Bo	*0.01*	*0.00*	*-0.24*	*-0.01*	*0.19*	*1*	
LOSS	*-0.07*	*-0.06*	*-0.07*	*-0.02*	*0.04*	*-0.12*	*1*

	DR	Female%	Female%*Critmass	LNSize	CEOChair	Litigation	LNMarket to Book	LOSS
DR	*1*							
Female%	*-0.15*	*1*						
Female%*Critmass	*-0.06*	*0.50*	*1*					
LNSize	*-0.11*	*0.22*	*0.06*	*1*				
CEOChair	*0.02*	*0.02*	*0.00*	*0.02*	*1*			
Litigation	*-0.26*	*-0.03*	*-0.04*	*-0.04*	*0.00*	*1*		
LNMarket to Book	*0.01*	*0.00*	*0.01*	*-0.24*	*-0.01*	*0.19*	*1*	
LOSS	*-0.07*	*-0.06*	*-0.03*	*-0.07*	*-0.02*	*0.04*	*-0.12*	*1*

Panel A, B, and C show correlation tables for regression 3, 4, and 5 respectively

Table 7: *Correlation tables for the main regressions (3), (4) and (5)*

Based on the histograms in Appendix 2, this thesis observes that all non-binary variables approximate a normal distribution. Those variables that are designed as binary are cumulatively exhaustive and show relatively equal distribution with the exception of three variables. CEOChair duality shows a large tendency towards segregation of the two roles, as only 192 firm year observations had combined CEO and chair of the board roles. Of the selected firm year observations only 77 observations reported a loss, indicating a large discrepancy between loss and profit observations. For Female%, only one firm year observation exceeds 50% of board observations, with a significant portion of the observations ranging from 0% to 30% board positions occupied by women. Finally, only 92 firm year observations satisfied the critical mass condition. This thesis however notes that all variables show dispersion amongst the possible categories, hence the variables are suited for their roles as predominantly control variables. Chapter 5 will continue with the presentation of the empirical results from the main regressions.

5. Empirical results

This chapter will present the empirical results obtained from the analysis as presented in chapter 4 of this thesis. First, this thesis will discuss the empirical findings of the revenue model and the findings from the conditional revenue model for each of the regressions (3), (4), and (5) as presented in chapter 4. Considering the endogeneity issue in the conditional revenue model as discussed in chapter 4, only the discretionary revenue proxy as derived from the revenue model will be presented in this chapter. Second, limitations and demarcations encountered in the analysis process will be noted, and their impact on the findings discussed along with a discussion of possible future research topics.

Regression (3) attempts to establish an association between female board presence and the discretionary revenue recognition activities in a firm. In this setting, female board presence defined as at least one board position being occupied by a female director. Table 8 below presents the results from the regression. Here, the coefficient column provides the values of the coefficient estimates. The standard error column provides the standard error of the coefficient, while the t-stat column provides the t Statistics. The t-statistic is computed as the coefficient divided by its standard error, and serves as an estimate of how accurately the coefficient is estimated. More extreme values of the t-stat indicate more accurately estimated coefficients, and the significant t-statistics are denoted with either *,**, or *** when they are significant at the 1%, 5%, or 10% significance level. STDev x is the standard deviation of the sample for that particular variable, and it is used to calculate the VIF value, the estimator of multicollinearity used in this thesis. For more elaborate regression results tables, please refer to Appendix 1. For complete descriptive statistics and correlation coefficients, please refer to Appendix 3.

Revenue Model	*Coefficients*	*Standard Error*	*t Stat*	*VIF*	*STDev x*
Intercept	*0.14*	*0.03*	5.35*		
Female	*-0.03*	*0.00*	-6.93*	*1.08*	*0.49*
LNSize	*-0.01*	*0.00*	-3.92*	*1.16*	*1.29*
CEOChair	*0.01*	*0.01*	1.23	*1.00*	*0.26*
Litigation	*-0.06*	*0.00*	-14.45*	*1.04*	*0.46*
LNMarket to Book	*0.01*	*0.00*	1.86***	*1.12*	*0.75*
LOSS	*-0.04*	*0.01*	-3.83*	*1.03*	*0.17*
Regression Statistics					
Mean Square Error	*0.50*				
R Square	*0.11*				
Adjusted R Square	*0.10*				
Standard Error	*0.10*				
Durbin-Watson	*0.37*				
Observations	*2586*				

,, and *** indicate significance at the 1%, 5%, and 10% level respectively*

Table 8: *regression statistics on the association between female board presence and discretionary revenue recognition*

Based on the table before, this thesis observes a significant negative coefficient for the female board presence variable, which indicates that when there is at least one female director present the use of discretionary revenue recognition decreases. Moreover, all control variables except for CEO Chair duality show statistical significance. The low values for the VIF indicate no multicollinearity is present in the model. The low Durbin Watson values indicate the absence of endogeneity. The cumulative findings as presented in the table 8 provide strong evidence in support of H1 of a negative association between female board presence and the discretionary revenue recognition activities in the firm.

Table 9 presents the findings in regard to H2, stating that the association between female board presence and the discretionary revenue recognition activities in the firm is depending on the relative number of female directors. Here, the female board presence is thus presented as the percentage of total board positions held by female directors.

Revenue model	Coefficients	Standard Error	t Stat	VIF	STDev x
Intercept	0.15	0.03	5.58*		
Female%	-0.16	0.02	-7.62*	1.05	0.10
LNSize	-0.01	0.00	-4.24*	1.13	1.29
CEOChair	0.01	0.01	1.32	1.00	0.26
Litigation	-0.06	0.00	-14.55*	1.04	0.46
LNMarket to Book	0.01	0.00	1.95**	1.13	0.75
LOSS	-0.05	0.01	-3.91*	1.03	0.17
Regression Statistics					
Mean Square Error	0.01				
R Square	0.11				
Adjusted R Square	0.11				
Standard Error	0.10				
Durbin-Watson	0.37				
Observations	2586				

,, and *** indicate significance at the 1%, 5%, and 10% level respectively*

Table 9: *regression statistics on the association between percentage of female board presence and discretionary revenue recognition*

The statistically significant negative coefficient for Female% indicates that firms with a larger percentage of female directors are associated with discretionary revenue recognition activities of lesser magnitudes. As in table 8, all control variables except for CEO Chair duality are statistically significant, while there is no indication of multicollinearity as shown in the low VIF values. Moreover, the Durbin Watson test indicates no endogeneity. These cumulative findings show strong support for H2.

To test H3, stating that the association between female board presence and discretionary revenue recognition is more pronounced when the 'critical mass' condition is satisfied, this thesis makes use of a regression with an interaction variable which partitions the sample in firms with more than 30% of the board positions occupied by women and those firms which do not satisfy this condition. Table 10 provides the results from this regression.

Revenue model	Coefficients	Standard Error	t Stat	VIF	STDev x
Intercept	0.15	0.03	5.56*		
Female%	-0.16	0.02	-6.64*	1.41	0.10
Critmass	0.10	0.07	1.43	48.34	0.19
Female%*Critmass	-0.28	0.21	-1.39	48.91	0.07
LNSize	-0.01	0.00	-4.23*	1.13	1.29
CEOChair	0.01	0.01	1.35	1.00	0.26
Litigation	-0.06	0.00	-14.50*	1.04	0.46
LNMarket to Book	0.01	0.00	2.02**	1.13	0.75
LOSS	-0.05	0.01	-3.89*	1.03	0.17
Regression Statistics					
Mean Square Error	0.01				
R Square	0.11				
Adjusted R Square	0.11				
Standard Error	0.10				
Durbin-Watson	0.38				
Observations	2586				

,, and *** indicate significance at the 1%, 5%, and 10% level respectively*

Table 10: *regression statistics on the association between percentage of female board presence and discretionary revenue recognition conditional on the critical mass condition*

Based on this table, this thesis observes that the percentage of female directors is still statistically significantly associated with smaller discretionary revenue recognition activities, however the critical mass condition is not statistically significantly associated with the discretionary revenue recognition activities of the firm. However the high VIF value for Critmass and Female%*Critmass indicate strong evidence of multicollinearity. In order to mitigate this problem and increase the quality of the model, the regression is redone without the Critmass variable, the results of which are presented in table 11 below.

Revenue model	***Coefficients***	***Standard Error***	***t Stat***	***VIF***	***St Dev x***
Intercept	0.15	0.03	5.56*		
Female%	-0.16	0.02	-6.69*	1.40	0.10
Female%*Critmass	0.01	0.03	0.17	1.34	0.07
LNSize	-0.01	0.00	-4.22*	1.13	1.29
CEOChair	0.01	0.01	1.32	1.00	0.26
Litigation	-0.06	0.00	-14.54*	1.04	0.46
LNMarket to Book	0.01	0.00	1.95**	1.13	0.75
LOSS	-0.05	0.01	-3.90*	1.03	0.17
Regression Statistics					
Mean Square Error	0.01				
R Square	0.11				
Adjusted R Square	0.11				
Standard Error	0.10				
Durbin-Watson	0.37				
Observations	2586				

,, and *** indicate significance at the 1%, 5%, and 10% level respectively*

Table 11: *regression statistics on the adjusted version of regression (5)*

From this table, this thesis observes that after adjusting for multicollinearity, Female% remains statistically significantly negative, while the interaction variable Female%*Critmass remains statistically insignificant. This finding indicates that the strength of the association between female board presence and discretionary revenue recognition activities in the firm is not influenced by the critical mass condition. Moreover, all control variables except for CEO Chair duality are statistically significant, similar to the models used to test H1 and H2. The low VIF values indicate that the multicollinearity issue has been resolved, while the Durbin Watson test excludes the possibility of endogeneity in the model. The cumulative findings do not support H3. These findings are contradicting those of Joecks et al. (2013), who found that female participation on corporate boards was strongly determined by whether or not the critical mass condition was satisfied. The contradictory findings presented in this thesis are likely caused by what association is measured. Whereas Joecks et al. (2013) attempts to investigate the association between female board participation and a general measure of board performance, this thesis aims to investigate the association between the female board

participation and a single measure of the board performance: discretionary revenue recognition. Joecks et al. (2013) may have had the association found in this thesis to be overshadowed by other instances where female board members heavily relied on the critical mass condition, resulting in the observed validity of the critical mass condition.

The findings of this thesis provide new insights for the body of literature on corporate governance, as it uses a single accrual account instead of an aggregate measure predominantly used in the prior literature. This makes comparing the results from this thesis to prior literature cumbersome, as most differences appear to be caused by the use of this construct. However notable differences between the findings in this thesis and those of previous researches will be commented on in the following section.

Sun et al. (2011) found no association between the gender of the independent audit committee members and the use of discretionary accruals. Although this thesis does not limit gender diversity to the independent audit committee, what is interesting is that Sun et al. (2011) argued that female directors did not always desire to-, or were not always able to convince their fellow committee members of their opinions. This discrepancy is likely caused through the construct of earnings management used by Sun et al. (2011) as they investigate the effect of female directors on earnings management cases which revolved around illegality, as the authors investigate the decisions from the Audit committee. Second, as this thesis uses a sample consisting of firms from the S&P1500 index, the presence of smaller firms with less media exposure reduces the effect of tokenism, which would explain why this thesis finds a statistically significant association.

Ye et al. (2010) found no association between the gender of the executives and the quality of reported earnings. Two interesting differences between this thesis and the research by Ye et al. (2010) are observed. First, this thesis uses of US-listed firms, compared to Chinese listed firms as used by Ye et al. (2010) The authors argue that the executive behavior in the Chinese firms is heavily influenced by the socialist norms on which the country is build. Here, all individuals are subjected to identical ethical standards, hence no difference in male and female perceptions of what is ethically acceptable or not are observed. Second, Ye et al. (2010) investigated the effect of gender from specific executives on the use ofearnings management, more specifically the gender of the CEO, the CFO, and the chair of the board. This thesis however, allows for a distinction in gender diversity of the complete board of directors. This might allow the effect of cumulative effort by the female board members to be observed.

The findings in this thesis show similarities to other research conducted prior to this thesis. More specifically, research by Krishnan and Parsons (2008) in addition found that firms with gender-diverse boards score more desirably on the earnings quality measures. Although the authors use a sample of only S&P 500 firms between 1996 and 2000, in which they compared the 25% of most- and least diverse boards, they found consistent and significant evidence that more diverse boards report higher quality earnings, largely due to more conservative accounting practices (Krishnan. Parsons. 2008). These findings are consistent with the findings in this thesis of a negative association between the female board presence and the discretionary revenue recognition. Srinidhi et al. (2011) observed similar findings using a sample of United States firms between 2001 and 2007. Combining these findings with those of Krishnan and Parsons (2008) and the findings in this thesis where the timeframe spans 2007-2014, suggest that the association between the female board participation and the conservative accounting practices remains present over time. Abbott et al. (2012) and Ho et al. (2015) provide evidence consistent with the findings in this thesis, as Abbott et al (2012) found that female board participation is negatively associated with the likelihood of a financial restatement, while Ho et al. (2015) found that firms led by a female CEO are significantly more conservative in their financial reporting.

6. Conclusion

This chapter will serve to summarize this thesis, as well as provide a summary of limitations and demarcations encountered in this thesis, and suggestions for possible future research based on these findings.

6.1. Conclusion

A popular topic in business research is that of corporate board characteristics and their effect on the effectiveness or efficiency of board operations. This thesis aims to contribute to the body of existing literature by taking a new approach to identifying the possible effect that gender differences on corporate boards has on the aggressiveness of firms in their financial reporting. More specifically, this thesis aimed to investigate the association between female board presence and the use of discretionary revenue recognition activities in a firm. This approach distinguishes itself from prior studies by directly modeling a single accrual, the discretionary revenue recognition, rather than a broad and general accrual approach. Making use of a sample of S&P 1500 companies between 2007 and 2014, this thesis finds that female board presence is strongly associated with a decrease in discretionary revenue recognition, and that this association is stronger for firms with higher percentages of board positions occupied by female directors. However, in contrast to prior research on the critical mass condition, a theory which states that for women for feel fully comfortable expressing their unique views in the boardroom they need to be surrounded by a group of their peers of at least 30% of the board positions, this thesis does not find any significant association between the critical mass condition and the use of discretionary revenue recognition activities.

6.2. Contributions to existing literature

The contributions from this thesis to the existing literature are twofold. First, the use of individual accrual accounts challenges the prevailing methods of generalized accrual models by attempting to demonstrate the benefits in inferring managerial intent more accurately. Second, this thesis contributes to the understanding of factors influencing accrual quality by attempting to demonstrate that female board members exert different tolerances to aggressive discretionary revenue recognition than male board members. Furthermore, this thesis may present useful information to stakeholders outside the world of academics. More specific, the observed significant difference in discretionary revenue recognition tolerance between male and female directors serves as possible evidence to the business case of women in highly ranking business functions, positions which are still perceived to be unfairly difficult to

achieve by women in the corporate world. However the lack of evidence supporting the critical mass condition found in this thesis indicates that these findings do not serve as evidence for the gender quotas instilled by many European legislative areas.

6.3. Limitations and demarcations

This thesis is affected by a number of factors limiting the generalizability and transferability of the observed results. First, this thesis has been conducted on firms listed on the US stock exchange; hence observed results may not occur in firms from different geographical areas or non-listed firms. Second, considering the United States did not have any form of gender-quota instilled during the timeframe of this sample, legislative issues prevent observed results from being transferable to geographical areas where such gender quota are in place. Third, this thesis opted for a wide spectrum of firms by basing the used sample on firms in the S&P1500 supercomposite index. Although this sample choice allows for results to be generalized over firms with a large variance in market capitalization, firm specific factors play an increasingly large role in the observed variance in discretionary revenue recognition. Fourth, although this thesis establishes an association between female board presence and a proxy for ethical financial reporting decision-making, it is not possible to infer causality from this statistical analysis. As many factors are known to influence board performance, this thesis addresses only one of many possible factors which simultaneously influence the way in which boards function. Fifth, although this thesis finds evidence for differences in tolerance towards discretionary revenue recognition between male and female board members, it does not become clear whether either of the two tolerances is considered desirable. Finally, the aim of this thesis is to further investigate the "nature versus Nurture" debate on what causes observed differences in gender-based decision (Talmud. Izraeli. 1999). Although the findings presented in this thesis serve as evidence for inherit gender-based differences in tolerance towards discretionary revenue recognition, the possibility of culturally instilled differences in decision-making cannot be excluded based on these findings.

6.4. Future research

Based on the findings in this thesis, this section suggests future topics of research, which could provide valuable insights in fields such as: corporate governance, financial reporting, and the interaction between firms and financial markets. First, a suggestion for future research is to apply the individual accrual method to different settings. Different accrual accounts can be used to proxy for different managerial intentions, hence different accounts could provide

insight on how differences in board characteristics influence a multitude of decision-making processes. Second, this thesis investigated whether male and female directors exhibit different tolerance levels towards discretionary revenue recognition activities, however it would be interesting to investigate whether the exhibited tolerance towards discretionary revenue recognition change over time, to provide further evidence in the "nature versus nurture" debate as in Talmud and Izraeli (1999). Finally, this thesis does not investigate a difference in value caused by discretionary revenue recognition; hence it does not become evident whether the observed difference between male and female directors provides value to various stakeholder groups. Future research could investigate whether such differences are valued by associating discretionary revenue recognition with financial market performance.

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8. Appendices

Appendix 1: Regression analysis tables

Revenue model:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.35
R Square	0.12
Adjusted R Square	0.12
Standard Error	0.10
Observations	2587

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2.00	3.81	1.91	175.12	0.00
Residual	2584.00	28.13	0.01		
Total	2586.00	31.94			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*VIF*	*STDev*
Intercept	0.51	0.03	17.62	0.00	0.45	0.57		
Sqr Defl Rev_3	-0.05	0.02	-2.67	0.01	-0.09	-0.01	5.66	0.24
LNDefl Rev4	0.09	0.01	10.21	0.00	0.07	0.10	5.66	0.57

Regression 3:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.33
R Square	0.11
Adjusted R Square	0.10
Standard Error	0.10
Observations	2586

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6.00	3.01	0.50	51.42	0.00
Residual	2579.00	25.12	0.01		
Total	2585.00	28.13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*VIF*	*STDev x*
Intercept	0.14	0.03	5.35	0.00	0.09	0.19		
Female	-0.03	0.00	-6.93	0.00	-0.04	-0.02	1.08	0.49
LNSize	-0.01	0.00	-3.92	0.00	-0.01	0.00	1.16	1.29
CEOChair	0.01	0.01	1.23	0.22	-0.01	0.02	1.00	0.26
Litigation	-0.06	0.00	-14.45	0.00	-0.07	-0.05	1.04	0.46
LNMarket to Book	0.01	0.00	1.86	0.06	0.00	0.01	1.12	0.75
LOSS	-0.04	0.01	-3.83	0.00	-0.07	-0.02	1.03	0.17

Regression 4:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.33
R Square	0.11
Adjusted R Square	0.11
Standard Error	0.10
Observations	2586

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6.00	3.10	0.52	53.27	0.00
Residual	2579.00	25.03	0.01		
Total	2585.00	28.13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*VIF*	*STDev x*
Intercept	0.15	0.03	5.58	0.00	0.10	0.20		
Female%	-0.16	0.02	-7.62	0.00	-0.20	-0.12	1.05	0.10
LNSize	-0.01	0.00	-4.24	0.00	-0.01	0.00	1.13	1.29
CEOChair	0.01	0.01	1.32	0.19	0.00	0.02	1.00	0.26
Litigation	-0.06	0.00	-14.55	0.00	-0.07	-0.05	1.04	0.46
LNMarket to Book	0.01	0.00	1.95	0.05	0.00	0.01	1.13	0.75
LOSS	-0.05	0.01	-3.91	0.00	-0.07	-0.02	1.03	0.17

Regression 5, no multicollinearity:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.33
R Square	0.11
Adjusted R Square	0.11
Standard Error	0.10
Observations	2586

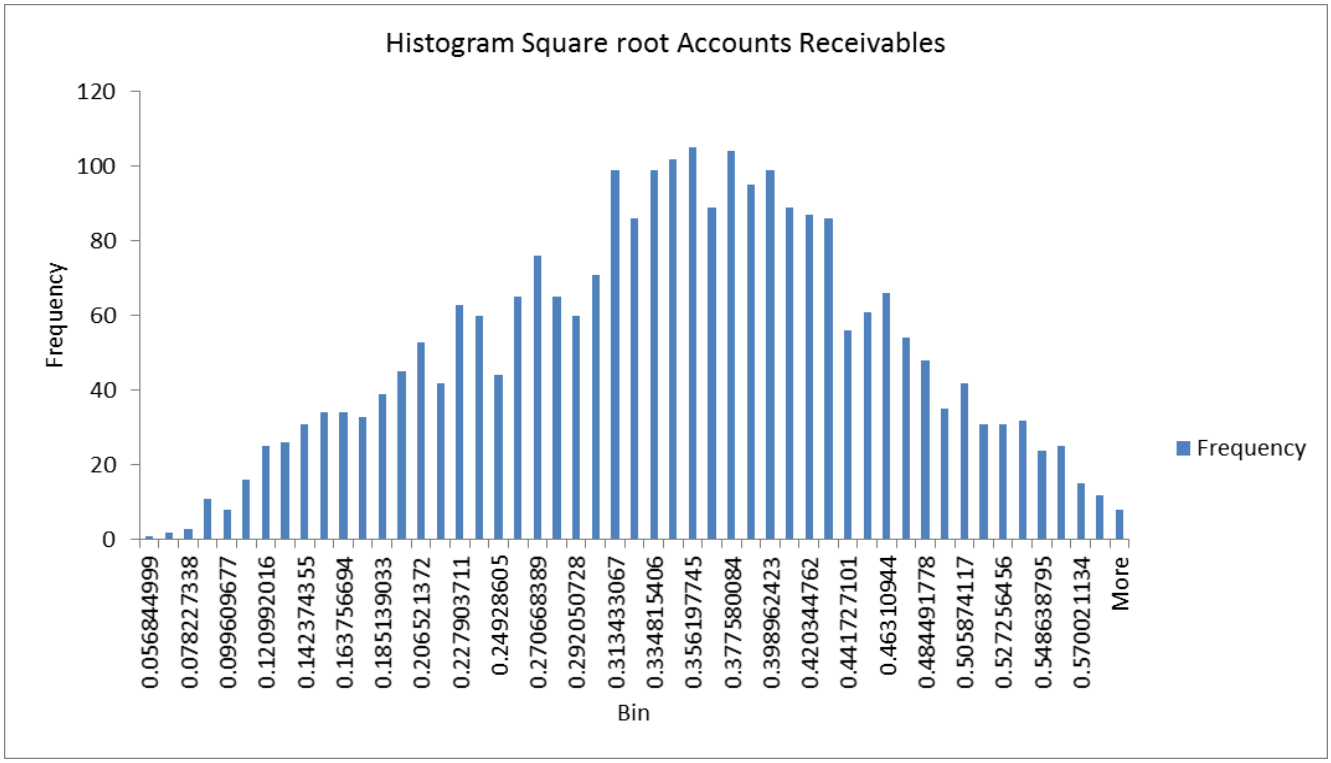
ANOVA

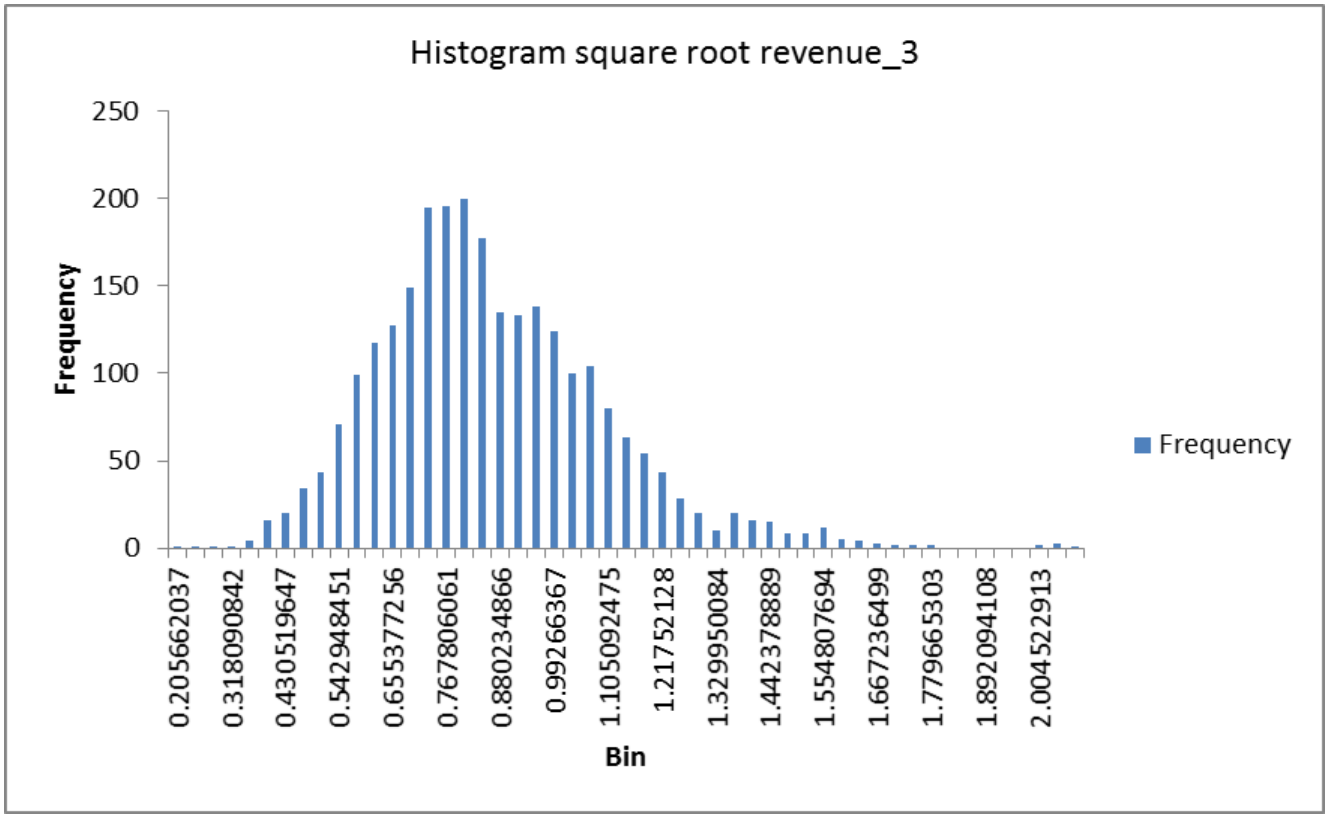
	df	*SS*	*MS*	*F*	*Significance F*
Regression	7.00	3.10	0.44	45.65	0.00
Residual	2578.00	25.03	0.01		
Total	2585.00	28.13			

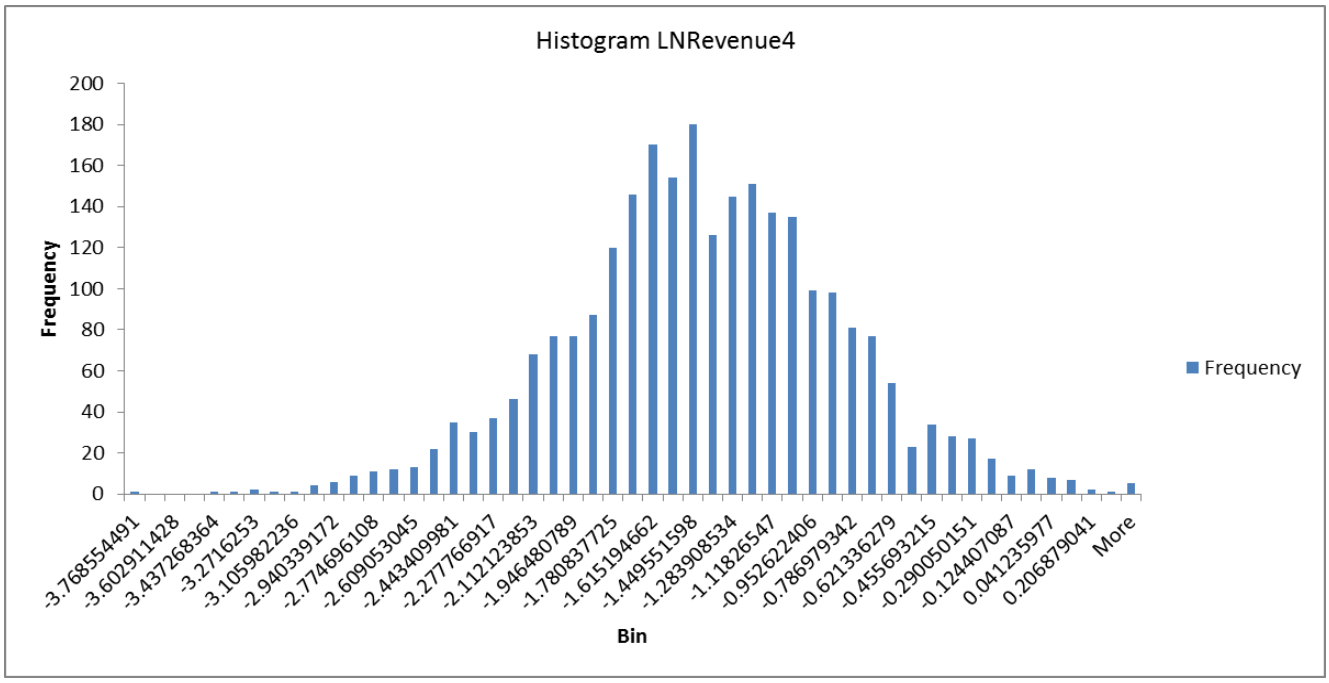
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*VIF*	*St Dev x*
Intercept	0.15	0.03	5.56	0.00	0.10	0.20		
Female%	-0.16	0.02	-6.69	0.00	-0.20	-0.11	1.40	0.10
Female%*Critmass	0.01	0.03	0.17	0.87	-0.06	0.07	1.34	0.07
LNSize	-0.01	0.00	-4.22	0.00	-0.01	0.00	1.13	1.29
CEOChair	0.01	0.01	1.32	0.19	0.00	0.02	1.00	0.26
Litigation	-0.06	0.00	-14.54	0.00	-0.07	-0.05	1.04	0.46
LNMarket to Book	0.01	0.00	1.95	0.05	0.00	0.01	1.13	0.75
LOSS	-0.05	0.01	-3.91	0.00	-0.07	-0.02	1.03	0.17

Appendix 2: Histograms

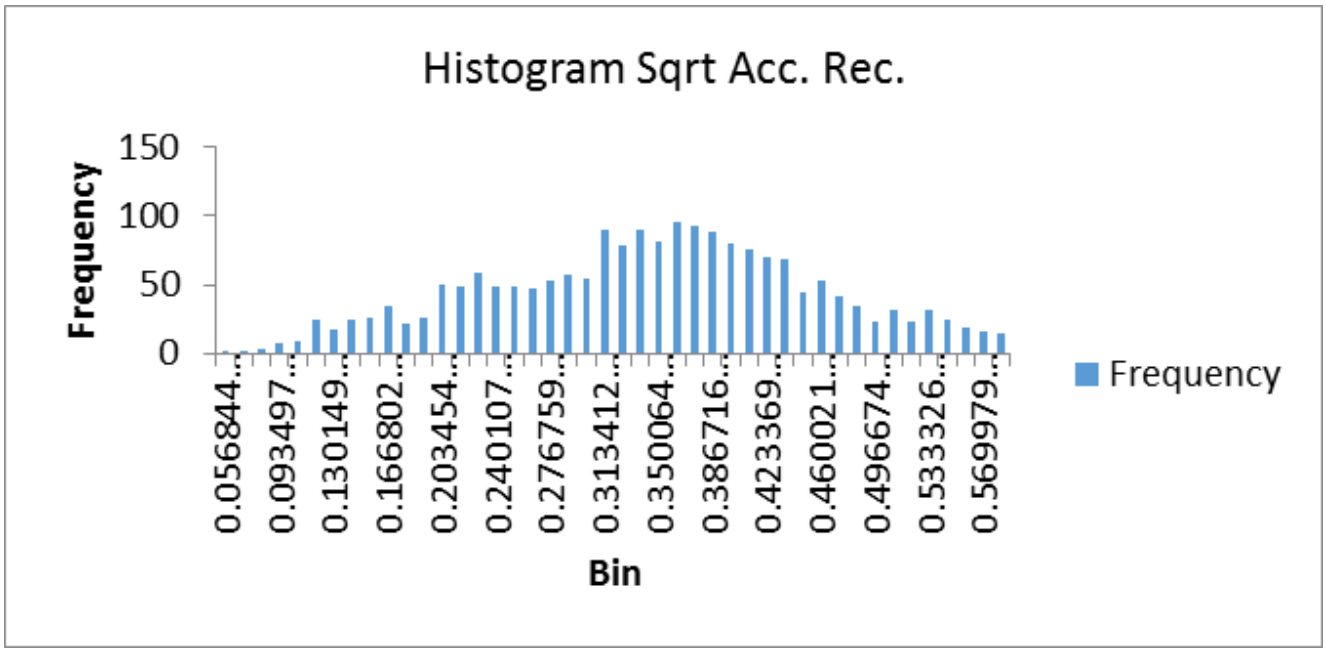
Revenue model:

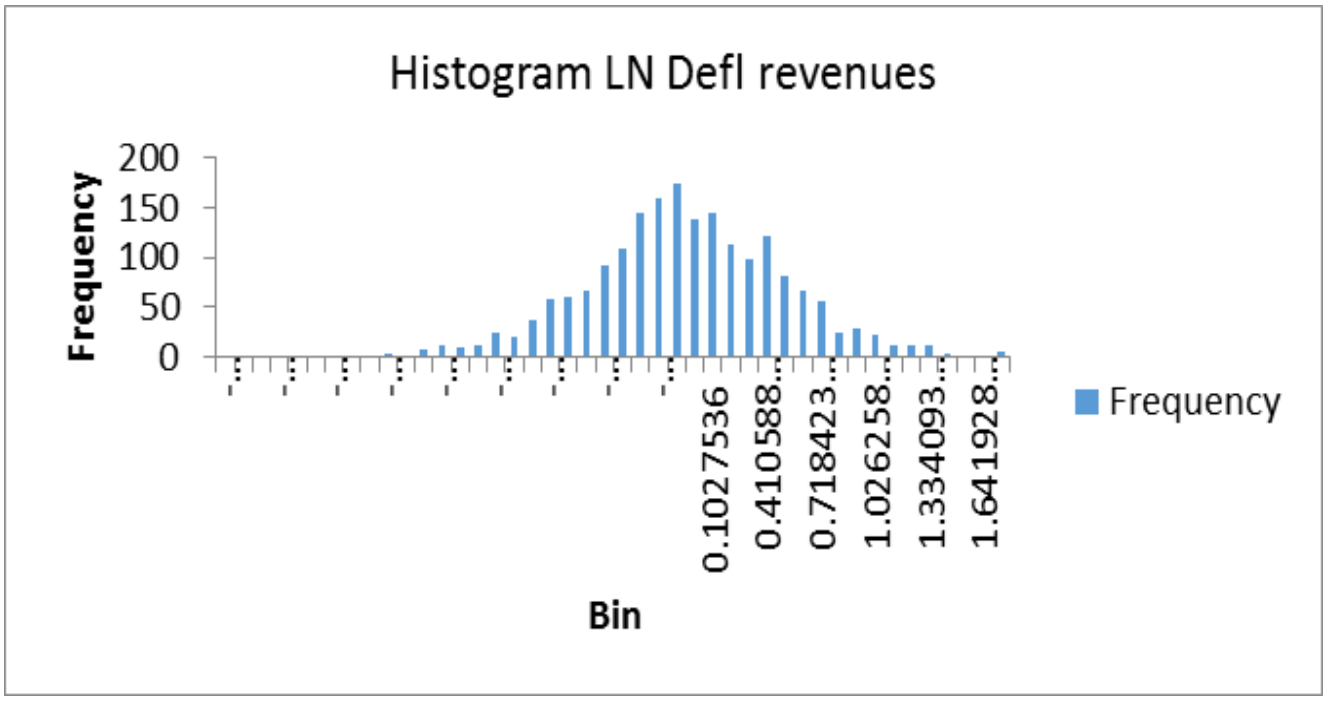


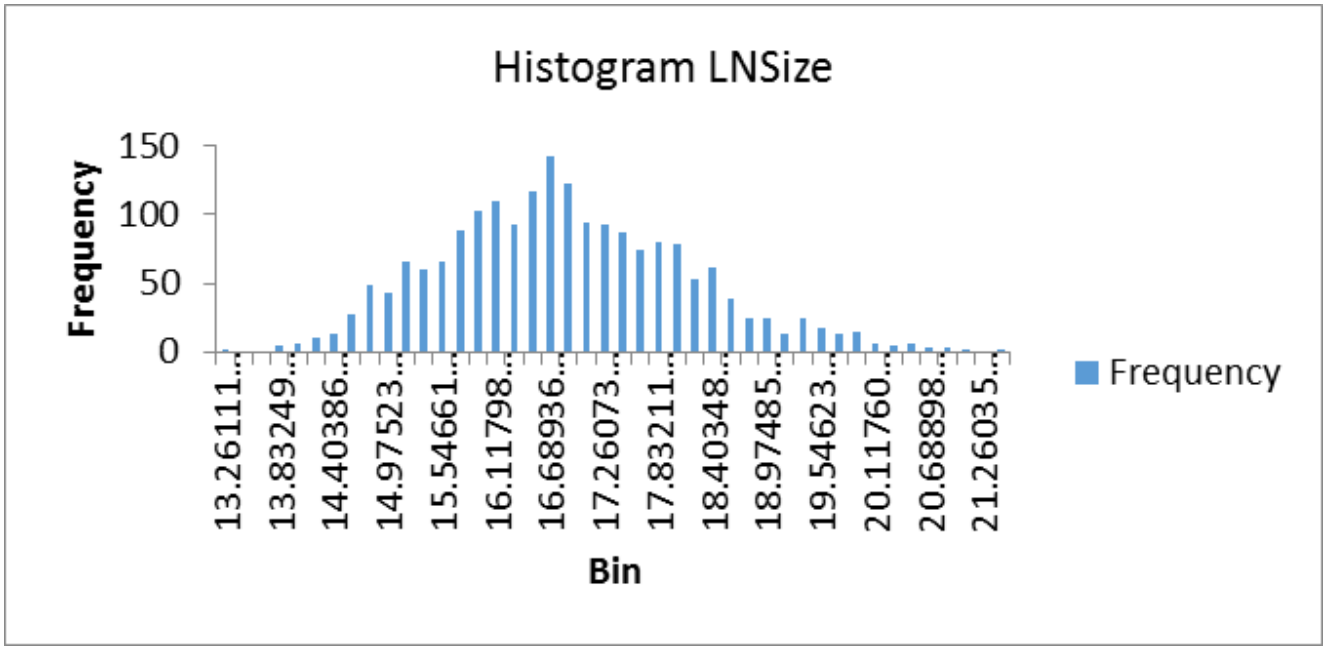


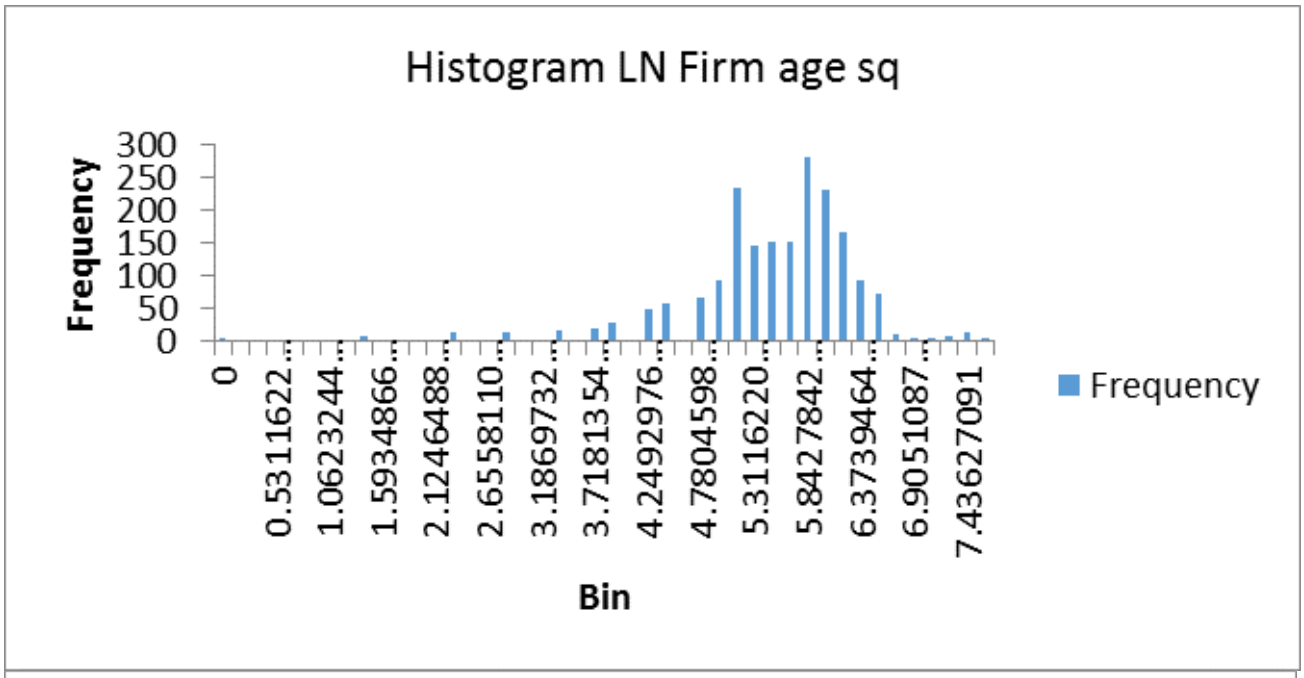


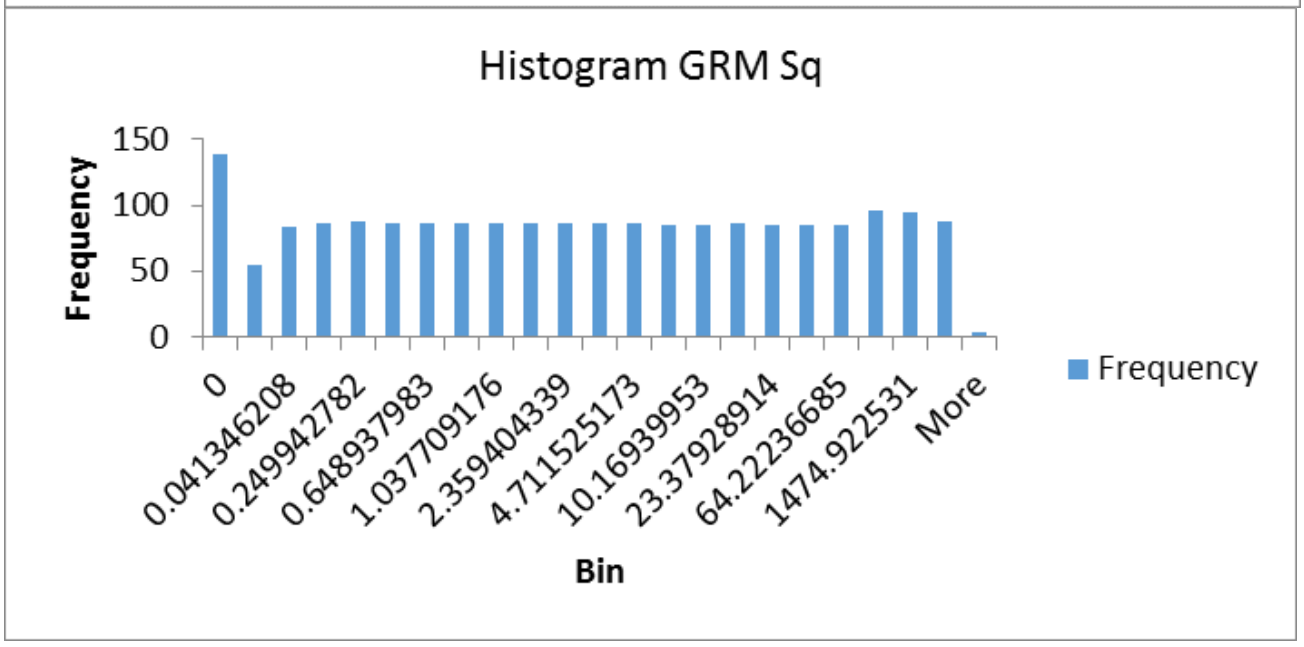
Conditional revenue model:

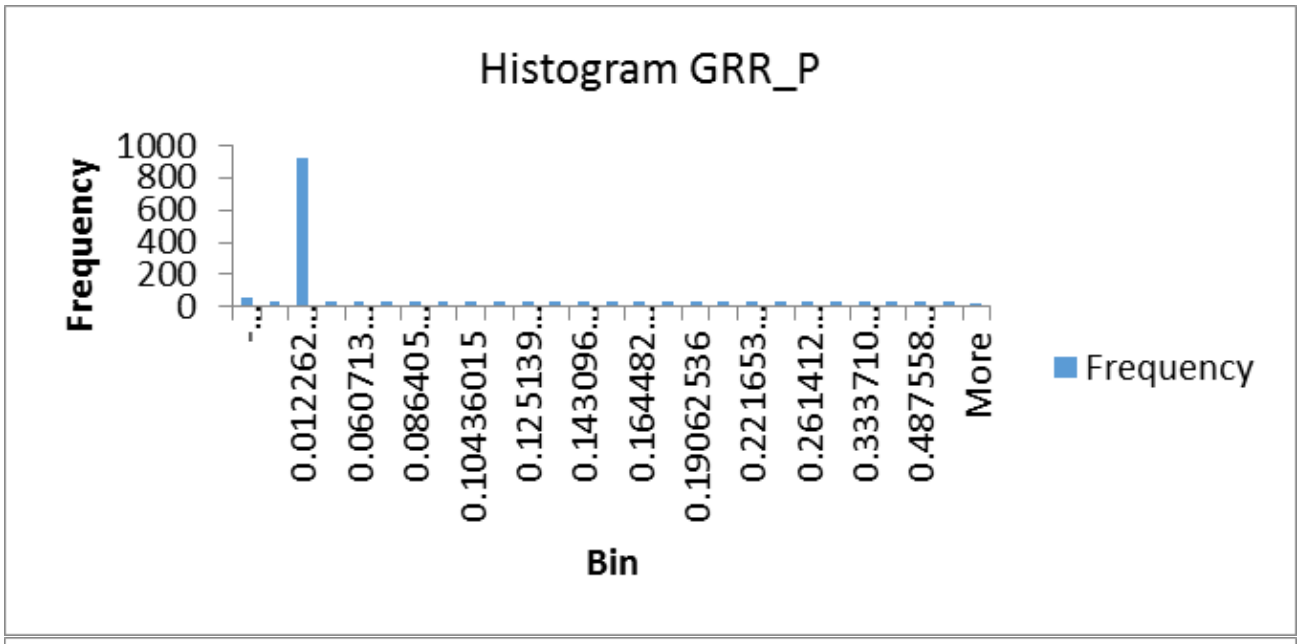


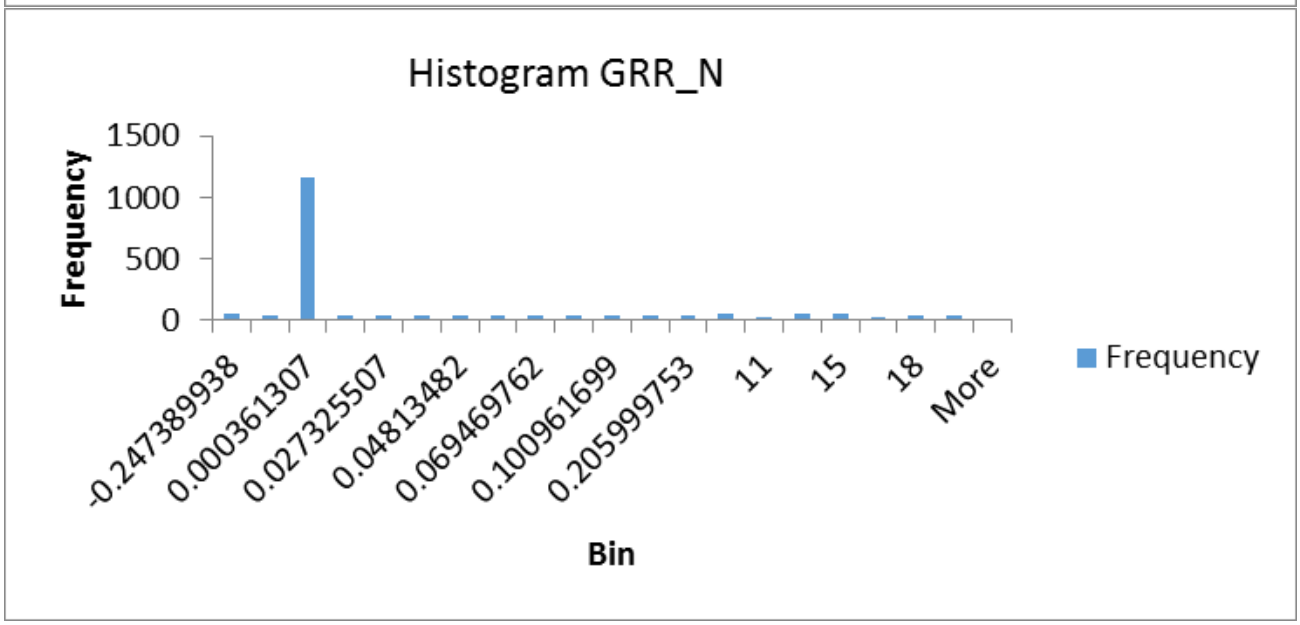

Histogram LN Defl revenues
Frequency
200
150
100
50
0
0.1027536
0.410588...
0.718423...
1.026258...
1.334093...
1.641928...
Bin
Frequency


Histogram LNSize
Frequency
150
100
50
0
13.26111...
13.83249...
14.40386...
14.97523...
15.54661...
16.11798...
16.68936...
17.26073...
17.83211...
18.40348...
18.97485...
19.54623...
20.11760...
20.68898...
21.26035...
Bin
Frequency


Histogram LN Firm age sq
Frequency
300
250
200
150
100
50
0
0
0.5311622...
1.0623244...
1.5934866...
2.1246488...
2.6558110...
3.1869732...
3.7181354...
4.2492976...
4.7804598...
5.3116220...
5.8427842...
6.3739464...
6.9051087...
7.43627091
Bin
Frequency

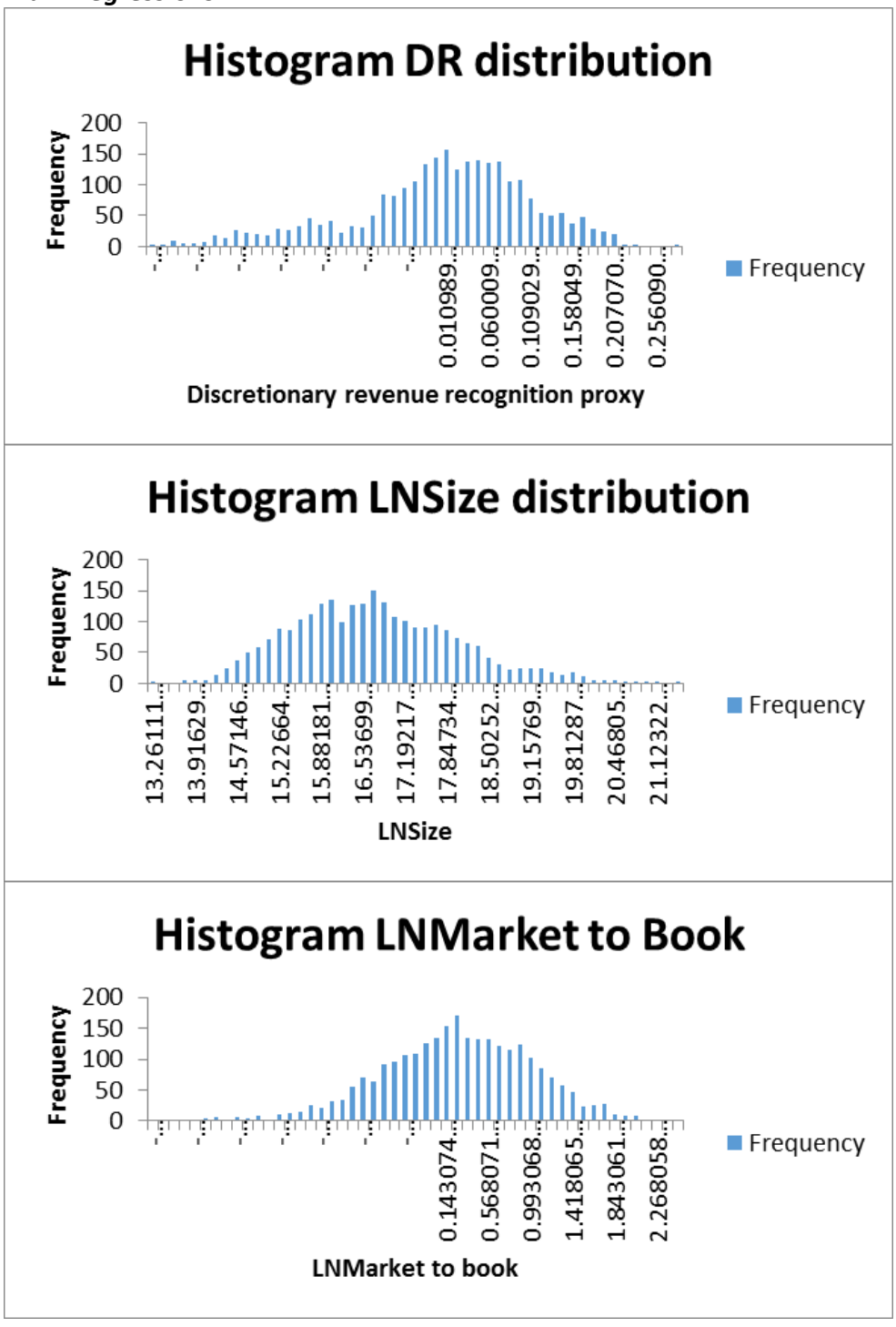

Histogram GRM Sq
Frequency
150
100
50
0
0
0.041346208
0.249942782
0.648937983
1.037709176
2.359404339
4.711525173
10.16939953
23.37928914
64.22236685
1474.922531
More
Bin
Frequency

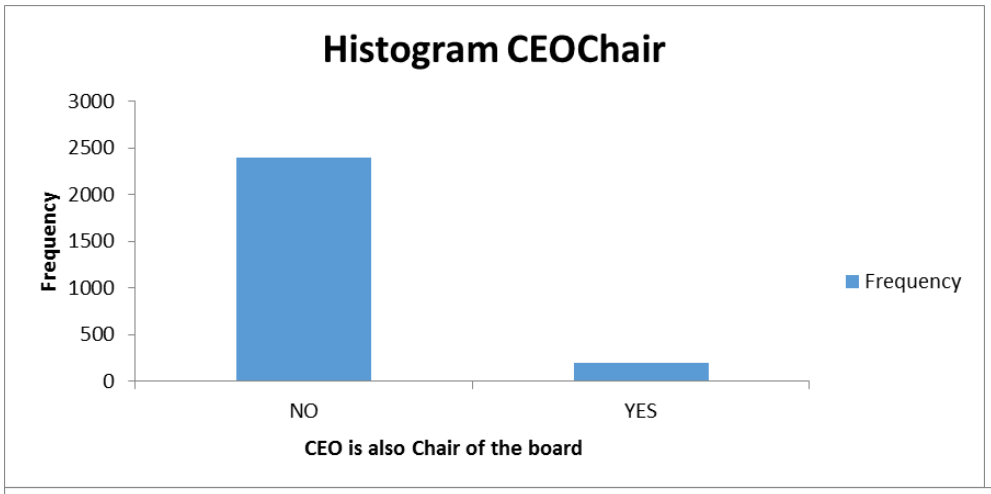


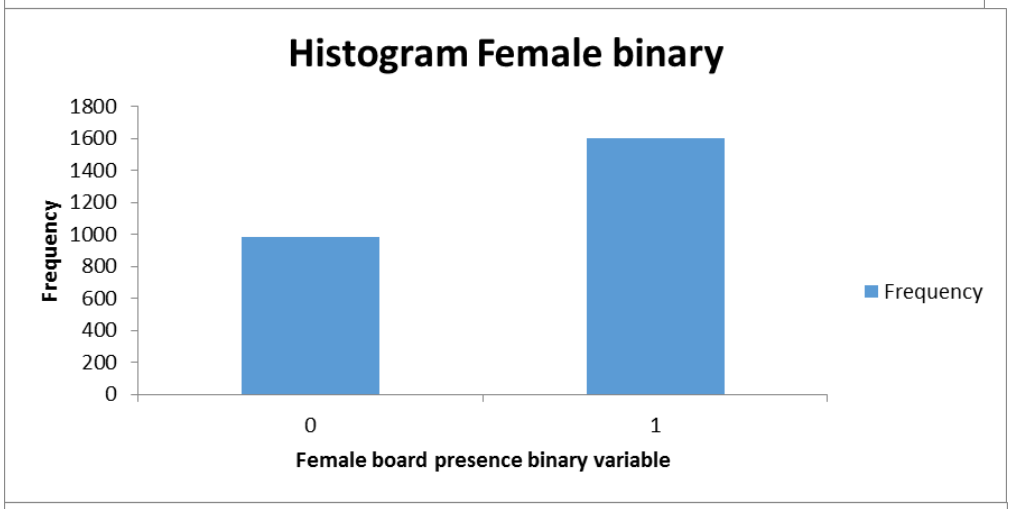


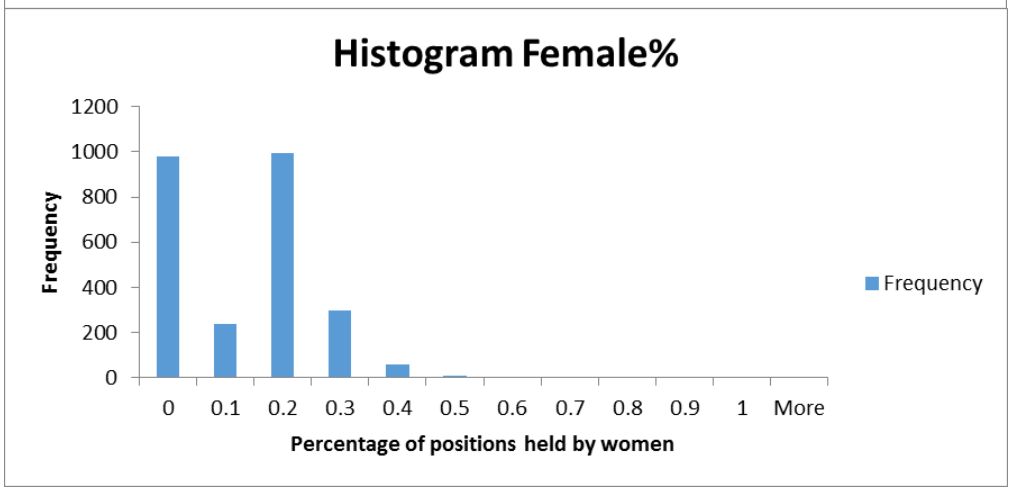
Note that GRR_P and GRR_N are designed with an interaction component, hence distribution is heavily concentrated around "0"

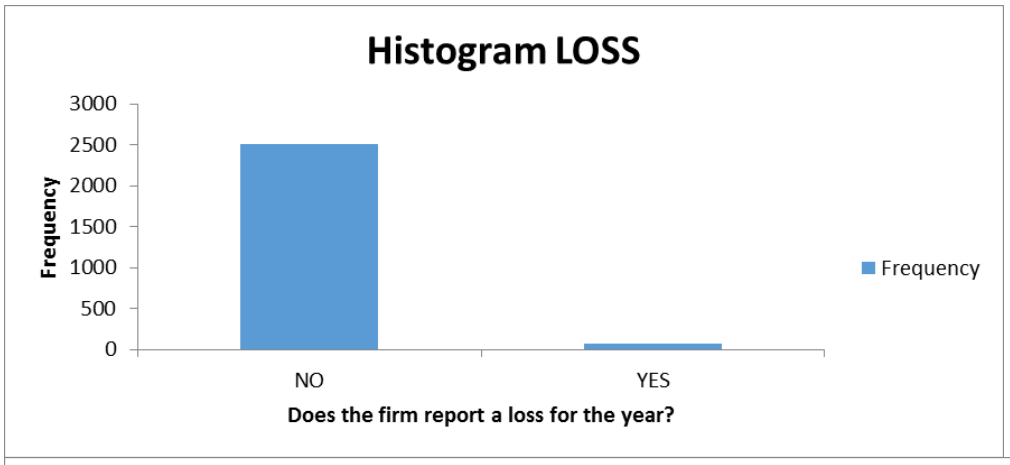
Main Regressions:

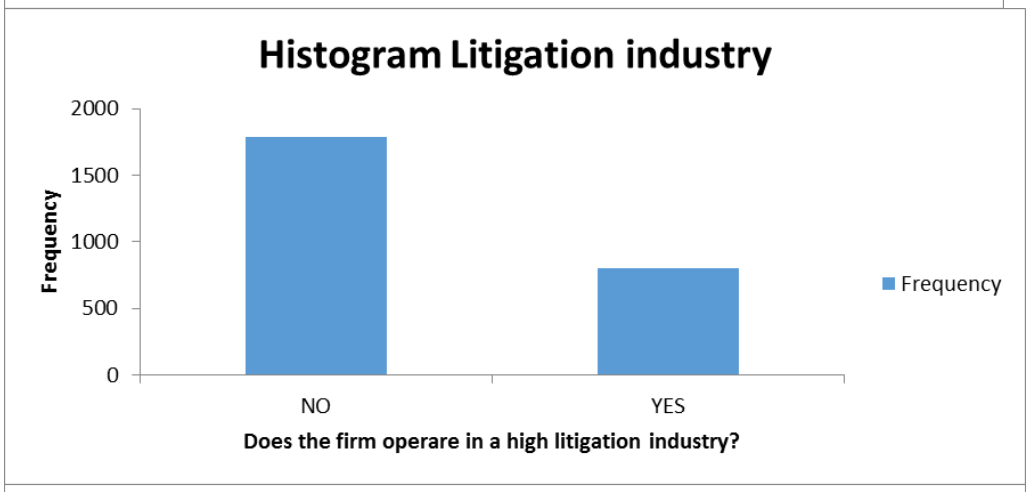


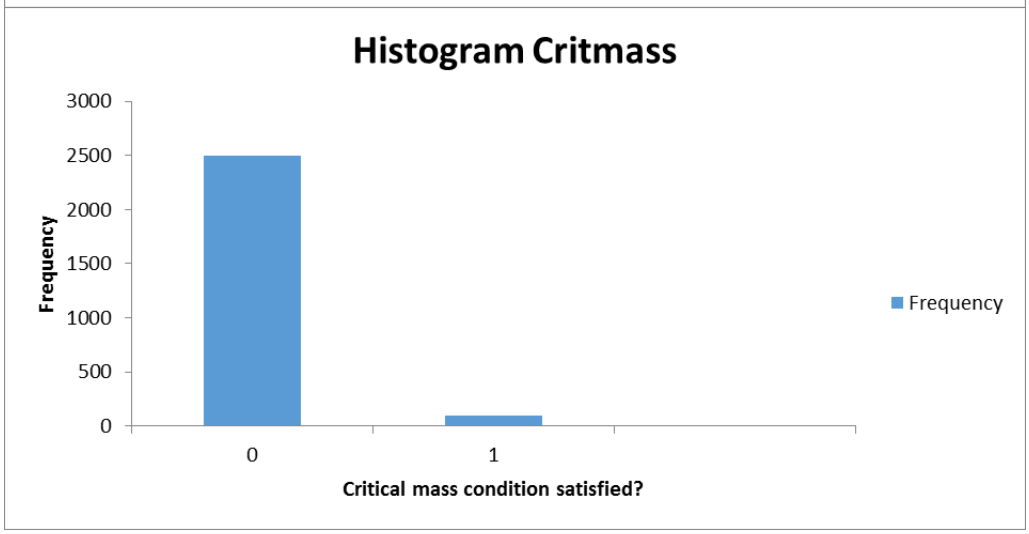

Histogram CEOChair
3000
2500
2000
1500
1000
500
0
Frequency
NO
YES
CEO is also Chair of the board
Frequency


Histogram Female binary
1800
1600
1400
1200
1000
800
600
400
200
0
Frequency
0
1
Female board presence binary variable
Frequency


Histogram Female%
1200
1000
800
600
400
200
0
Frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
More
Percentage of positions held by women
Frequency


Histogram LOSS
3000
2500
2000
1500
1000
500
0
Frequency
NO
YES
Does the firm report a loss for the year?
Frequency


Histogram Litigation industry
2000
1500
1000
500
0
Frequency
NO
YES
Does the firm operare in a high litigation industry?
Frequency


Histogram Critmass
3000
2500
2000
1500
1000
500
0
Frequency
0
1
Critical mass condition satisfied?
Frequency

Appendix 3: Descriptive statistics- and correlation tables

Revenue model:

Statistic:	*Defl. Accounts Rec*	*Sqr Defl Rev_3*	*LNDefl Rev4*
Mean	0.34	0.84	-1.44
Standard Error	0.00	0.00	0.01
Median	0.35	0.81	-1.46
Mode	#N/A	#N/A	#N/A
Standard Deviation	0.11	0.24	0.57
Sample Variance	0.01	0.06	0.33
Kurtosis	-0.55	1.72	0.36
Skewness	-0.14	0.88	-0.07
Range	0.53	1.87	4.14
Minimum	0.06	0.21	-3.77
Maximum	0.59	2.08	0.37
Count	2587	2587	2587

	Defl. Accounts Rec	*Sqr Defl Rev_3*	*LNDefl Rev4*
Defl. Accounts Rec	1		
Sqr Defl Rev_3	0.29	1	
LNDefl Rev4	0.34	0.91	1

Conditional revenue model:

Statistic	*Sqrt Defl. Account rec*	*LN Defl Revenue total*	*LNSize*	*LN Firm age_SQ*	*GRR_P*	*GRR_N*	*GRM_SQ*
Mean	0.34	0.10-	16.75	5.42	0.10	2.08	1,154.98
St Error	0.00	0.01	0.03	0.02	0.01	0.12	316.79
Median	0.34	0.12-	16.66	5.55	-	-	2.35
Mode	-	-	-	5.55	-	-	-
St Dev	0.11	0.56	1.29	0.83	0.27	5.45	13,916.98
Sample Var	0.01	0.31	1.68	0.70	0.07	29.66	193,682,297.17
Kurtosis	0.50-	0.55	0.05	5.72	586.23	6.91	297.20
Skewness	0.12-	0.09-	0.38	1.59-	18.89	2.66	16.76
Range	0.53	4.41	8.19	7.61	9.24	40.69	304,460.26
Minimum	0.06	2.67-	13.26	-	0.40-	0.69-	-
Maximum	0.58	1.74	21.45	7.61	8.84	40.00	304,460.26
Count	1930	1930	1930	1930	1930	1930	1930

	Sqrt Defl. Account rec	*LN Defl Revenue total*	*LNSize*	*LN Firm age_SQ*	*GRR_P*	*GRR_N*	*GRM_SQ*
Sqrt Defl. Account rec	1						
LN Defl Revenue total	0.33	1					
LNSize	-0.18	-0.28	1				
LN Firm age_SQ	0.04	-0.06	0.21	1			
GRR_P	0.08	0.00	0.03	-0.03	1		
GRR_N	0.02	0.04	-0.02	0.02	0.00	1	
GRM_SQ	0.04	0.07	0.17	-0.01	0.00	-0.01	1

Regression 3:

Statistic	*DR*	*Female*	*LNSize*	*CEOChair*	*Litigation*	*LNMarket to Book*	*LOSS*
Mean	0.00	0.62	16.64	0.07	0.31	0.19	0.03
Standard Error	0.00	0.01	0.03	0.01	0.01	0.01	0.00
Median	0.01	1.00	16.56	0.00	0.00	0.21	0.00
Mode	-	1.00	-	0.00	0.00	-	0.00
Standard Deviation	0.10	0.49	1.29	0.26	0.46	0.75	0.17
Sample Variance	0.01	0.24	1.67	0.07	0.21	0.57	0.03
Kurtosis	0.28	-1.75	-0.01	8.50	-1.33	0.23	28.67
Skewness	-0.63	-0.50	0.45	3.24	0.82	-0.29	5.54
Range	0.61	1.00	8.19	1.00	1.00	5.31	1.00
Minimum	-0.33	0.00	13.26	0.00	0.00	-2.83	0.00
Maximum	0.28	1.00	21.45	1.00	1.00	2.48	1.00
Count	2586	2586	2586	2586	2586	2586	2586

	DR	*Female*	*LNSize*	*CEOChair*	*Litigation*	*LNMarket to Book*	*LOSS*
DR	1						
Female	-0.15	1					
LNSize	-0.11	0.27	1				
CEOChair	0.02	0.01	0.02	1			
Litigation	-0.26	-0.02	-0.04	0.00	1		
LNMarket to Book	0.01	-0.02	-0.24	-0.01	0.19	1	
LOSS	-0.07	-0.06	-0.07	-0.02	0.04	-0.12	1

Regression 4:

Statistic	*DR*	*Female%*	*LNSize*	*CEOChair*	*Litigation*	*LNMarket to Book*	*LOSS*
Mean	0.00	0.10	16.64	0.07	0.31	0.19	0.03
Standard Error	0.00	0.00	0.03	0.01	0.01	0.01	0.00
Median	0.01	0.11	16.56	0.00	0.00	0.21	0.00
Mode	-	0.00	-	0.00	0.00	-	0.00
Standard Deviatior	0.10	0.10	1.29	0.26	0.46	0.75	0.17
Sample Variance	0.01	0.01	1.67	0.07	0.21	0.57	0.03
Kurtosis	0.28	0.06	-0.01	8.50	-1.33	0.23	28.67
Skewness	-0.63	0.67	0.45	3.24	0.82	-0.29	5.54
Range	0.61	0.57	8.19	1.00	1.00	5.31	1.00
Minimum	-0.33	0.00	13.26	0.00	0.00	-2.83	0.00
Maximum	0.28	0.57	21.45	1.00	1.00	2.48	1.00
Count	2586	2586	2586	2586	2586	2586	2586

	DR	*Female%*	*LNSize*	*CEOChair*	*Litigation*	*LNMarket to Book*	*LOSS*
DR	1						
Female%	-0.15	1					
LNSize	-0.11	0.22	1				
CEOChair	0.02	0.02	0.02	1			
Litigation	-0.26	-0.03	-0.04	0.00	1		
LNMarket to Book	0.01	0.00	-0.24	-0.01	0.19	1	
LOSS	-0.07	-0.06	-0.07	-0.02	0.04	-0.12	1

Regression 5, no multicollinearity:

Statistic	*DR*	*Female%*	*Female%*Critmass*	*LNSize*	*CEOChair*	*Litigation*	*LNMarket to Book*	*LOSS*
Mean	0.00	0.10	0.01	16.64	0.07	0.31	0.19	0.03
St Error	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.00
Median	0.01	0.11	0.00	16.56	0.00	0.00	0.21	0.00
Mode	-	0.00	0.00	-	0.00	0.00	-	0.00
St Dev	0.10	0.10	0.07	1.29	0.26	0.46	0.75	0.17
Sample Var	0.01	0.01	0.00	1.67	0.07	0.21	0.57	0.03
Kurtosis	0.28	0.06	25.99	-0.01	8.50	-1.33	0.23	28.67
Skewness	-0.63	0.67	5.21	0.45	3.24	0.82	-0.29	5.54
Range	0.61	0.57	0.57	8.19	1.00	1.00	5.31	1.00
Minimum	-0.33	0.00	0.00	13.26	0.00	0.00	-2.83	0.00
Maximum	0.28	0.57	0.57	21.45	1.00	1.00	2.48	1.00
Count	2586	2586	2586	2586	2586	2586	2586	2586

	DR	*Female%*	*Female%*Critmass*	*LNSize*	*CEOChair*	*Litigation*	*LNMarket to Book*	*LOSS*
DR	1							
Female%	-0.15	1						
Female%*Critmass	-0.06	0.50	1					
LNSize	-0.11	0.22	0.06	1				
CEOChair	0.02	0.02	0.00	0.02	1			
Litigation	-0.26	-0.03	-0.04	-0.04	0.00	1		
LNMarket to Book	0.01	0.00	0.01	-0.24	-0.01	0.19	1	
LOSS	-0.07	-0.06	-0.03	-0.07	-0.02	0.04	-0.12	1